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Volume 4 Number 9
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April 30, 1985

CONCURRENT GUIDE TO IBM PERSONAL COMPUTERS

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Now you won't have to wait for the difficult to find hard-disk version of the IBM AT (model 99). You can buy the floppy disk IBM AT (model 68), add our hard disk and tape drive system for about what you'd pay for the AT hard disk upgrade alone. It's almost like getting the tape drive free.

Let's face it, we've all heard the horror stories of people who've lost data on their hard disk. True, it doesn't happen often, but then disaster seldom does. With the amount of data you can put on a hard disk these days, no one in business can afford even a small disaster.

When did you last backup your hard disk?

Oh, you did it once with floppies

and it was so time consuming that now you've convinced yourself nothing will go wrong? In other words, it can't happen to you. And besides, at the prices they're asking for tape backup—\$2,000 and up—you're willing to take a chance. You've seen some tape drives for less, but you have to buy an expensive hard disk to go with it, and you've already got a good hard disk. Where can you turn for relief?

IBM Compatible tape drive system complete for \$995

The Express Systems™ tape drive comes complete—half-high tape drive, controller, and software—for only \$995. It's absolutely IBM compatible—all 60 megabytes of it.

You can use your tape drive in the event your hard disk fails. And if you have to replace your hard disk, the tape's ability to read bad sectors will let you replace your hard disk with another even if the new one is not error-free. The tape requires very low power, too.

And it doesn't poke along. It reads and writes at 90 inches per second (ips) and transfers data at up to 3.75 megabytes per minute in the streaming mode. You don't have to be a rocket scientist to figure that you can perform an image backup of a 20 megabyte hard disk in about 5 minutes. But practically speaking, once you back up your hard disk completely for the first time, you never need to do more than invoke the archive command—that convenient command that tells your new tape drive to back up everything since you last backed up. If you back up as often as you should, your Express Systems tape drive will finish the job virtually in seconds.

The Express Systems software has additional benefits, like enabling you to use PC DOS terminology such as *.**, *.**, and *.**. It also has a built-in reformatter, built-in verification (to make sure you transferred what you thought you did), and it's prompt driven, which means it asks you exactly what you want to do.

Easy to install

Before you get intimidated about installing our tape drive internally, you should understand that IBM doesn't think it's too difficult. They're selling IBM PC ATs with instructions on how to add additional hard disks in the *Installation and Setup* manual that comes with the AT.

Our instructions for installing your new Express Systems tape drive follow IBM's clear, simple instructions.

We even provide the tape cartridge

Most people don't realize that the tape cartridge contains most of the critical mechanisms to insure data integrity. In order to be sure that you get the best insurance for your data (after all, isn't that why you're buying it?) we encourage you to use Express Systems' specially tested tape cartridges. We're not going to kid you and tell you others won't work, but here's what's special about Express Systems' tape cartridges.

First, they are tested down four separate tracks from end-to-end, not just down the center of the first 150 feet, like some others do. We use three screws to hold the cover on instead of four. This simple triangular arrangement keeps the baseplate flat, just like three legs work better than four to make a table steady. Since all tape drives reference everything to the baseplate, this alignment is critical. We also use special rollers to dissipate possible static electricity buildup—something that can ruin your whole day.

And finally, we will sell you tape cartridges in boxes of three instead of the usual five. So, you get higher quality with a smaller quantity commitment. And we compound the savings with a lower per unit price, just \$35.00 instead of the usual \$45.00 most retailers charge.



The Express Systems tape drives come with Express Certified™ 555 or 600 1/2-inch tape cartridges with quadruple end-to-end testing for extra insurance of your data.



The IBM AT installation manual shows how easily you can install internal storage drives yourself.



Need a hard disk?

Depending on whether you have an IBM PC, XT, or AT you may want additional hard disk storage. We have those too. We offer 10, 21 and 31 megabytes of formatted hard disk storage.

For the most part, our drives are made with plated media,



which means there is less chance to damage them. (Let's face it, the oxide that most disks come with is nothing more than rust.) We then test the drives, pre-format them, and install DOS 3.0 so that you're ready to begin transferring files. We even include DOS 3.0 documentation.

And they're 100 percent IBM compatible. The controller we send you for the XT is an upgraded version of the XT controller from the same company that makes the XT controller. In fact, the Express Systems controller is an improved controller which requires less power so that it is more reliable than any other standard controller.

We provide the power too.

If you want to upgrade your IBM PC, there's just isn't any way around upgrading your power supply—if you want to have true XT or better capability. Some companies say that their hard disks don't require any increase in power—and they might be right. But don't add anything to your slots, because the minute you do, you'll need more power. That's the bad news.

The good news is that our power supplies are inexpensive. How's \$99.50 for an XT power supply? We mean a full 130 watts of power. The other good

news is that it's held in by only 4 screws. Express Systems' power supplies can be changed in 20 minutes, a small price in time for the peace of mind to convert your PC to an XT-compatible machine and avoid the unsightly "wart-like" power supply add-ons that some companies insist you paste on the back of your PC.

Express Systems Upgrade Kits

(Includes controller, software, and cable where appropriate)

IBM AT (model 99) to AT ExPlus™	
1 half-high tape drive system	\$995
IBM XT to XT ExPlus	
1 half-high floppy and 1 half-high tape drive system	\$1095
IBM AT (model 68) to AT ExPlus	
21 Megabyte upgrade	\$1895
1 half-high 21 megabyte hard disk with half-high tape drive system	\$2195
31 Megabyte upgrade	
1 half-high 31 megabyte hard disk with half-high tape drive system	\$2095
IBM PC to XT ExPlus	
2 half-high floppies, 1 half-high 10 megabyte hard disk with controller, 1 half-high tape drive system and 130 watt power supply	

news is that it's held in by only 4 screws. Express Systems' power supplies can be changed in 20 minutes, a small price in time for the peace of mind to convert your PC to an XT-compatible machine and avoid the unsightly "wart-like" power supply add-ons that some companies insist you paste on the back of your PC.

But from a mail order house?

We get tired of the snide remarks some people make about mail order houses. The comments are usually spread by distributors and retailers who are getting cut out of 15 and 35 percent margins, respectively. If we went through distribution—you'd have the privilege of paying for large glass windows, rugs, salesmen, etc.—but we'd also be selling this tape drive for \$1495.

We're not criticizing distributors and retailers. They perform a valuable service. But you don't need them if you know what you want. And you can

certainly install it yourself. IBM has proved it with their instructions for self-installation that come with the new IBM PC AT.

And speaking of IBM, the next time you hear anyone criticize mail order as a way to buy computer equipment, remind them that IBM is now in the mail order business.

Warranty

We offer you a one year warranty on our hard disks—the same as IBM on the AT and 90 days on the tape drives. (It's all the manufacturer gives us.) If anything goes wrong with your tape or disk drive or hard disk, send it back in the box it came in. However, we have found that we can usually solve the problem over the phone. So call first for a return authorization number because we can't accept any returns without it.

Immediate delivery

We have four types of delivery: *Next Flight Out™* if you need it immediately; *Next Day Express™* and *Day After Tomorrow™* if you can wait a day or two; and our normal delivery—which we pay—if you can wait a few days.



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*Subtract \$195 for IBM AT which does not require hard disk controller

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IBM



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Five reasons why the Hercules Color Card is better.



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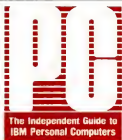
Hercules Color Card \$245

- | | | |
|------------------|--|---|
| 1. Compatibility | Runs hundreds of graphics programs. | Runs the same hundreds of graphics programs. "The Hercules Color Card is so nearly identical to the IBM Color/ Graphics Card that it's almost uncanny." PC Mag. |
| 2. Printer port. | None. | Standard. Our parallel port allows you to hook up to any IBM compatible printer. |
| 3. Size. | 13.25 inches. Limited to long slots. | 5.25 inches. Fits in a long or short slot in a PC, XT, AT or <i>Portable</i> . |
| 4. Flexibility. | Can't always work with a Hercules Graphics Card. | Always works with a Hercules Graphics Card by means of a software switch. |
| 5. Warranty. | 90 days. | Two years. |

Any one of these five features is enough reason to buy a Hercules Color Card. But perhaps the most convincing reason of all is just how easy the Hercules Color Card is to use: "Right out of the box, the Hercules Color Card goes into an empty expansion slot, ready for you to plug in . . . and go to work—no jumpers, no software. For most applications, it's just that easy." PC Magazine.

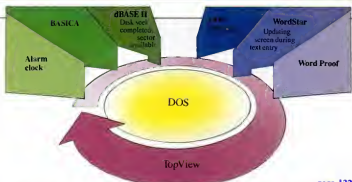
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The Independent Guide to
IBM Personal Computers

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*Russell Lipton/*With its heavy use of menus and its forms-oriented approach to data entry, GOLDATABASE may not be exciting, but it offers a cluster of reasonable database manager features particularly well suited for novices.

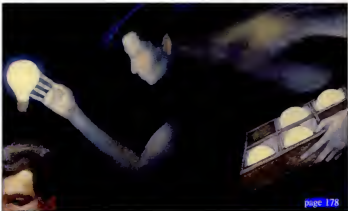
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John Phillips/DBI Software's database manager, KALEIDOSCOPE, looks pretty snazzy on the outside, but it needs considerable improvements to live up to its manufacturer's billing as "your guiding light to the fourth generation."

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*Bruce V. Lewenstein/*Software piracy has been steadily robbing our economy of, perhaps, hundreds of millions of dollars. In addition, some observers feel that it has been subverting our ethics.



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Breakthroughs in flexibility and performance let you upgrade your PC storage and optimize your total system.

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Javelin's rigorous quality program.

Javelin's reliability, like that of every Emulex product, is built in and guaranteed. All active components are pre-aged. Subassemblies are cycled environmentally—under power, performing diagnostic tests and the total system is integrally tested.

*The Small Computer System Interface (SCSI) is an interface standard that specifies the mechanical, electrical and functional requirements for a small computer I/O bus interface and command set for peripheral devices commonly used with small computers.

Javelin features a full range of utilities that allow for flexible expansion with minimal user intervention.

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- Advanced disk and tape diagnostics

Javelin is a product of Emulex Corporation, an industry leader in the development of high-performance controllers, communications products and packaged subsystems for PC's, micro, mini and super mini-computers.

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Yes	No	No	No
Yes	No	No	No
Yes	No	No	No
Yes	No	No	No
Yes	No	No	No
Standard AND Financial	Standard	Standard	Standard
10	1	1	1
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Effortless Communication

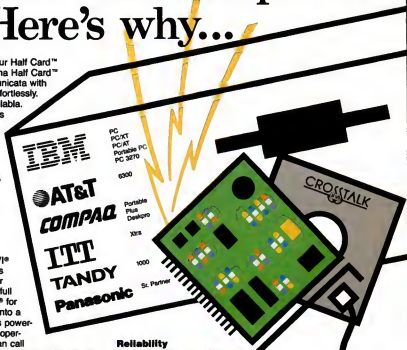
Each Half Card™ comes with Crosstalk-XVI® communications software, by Microstuf. It's the easiest to use, whether you're a beginner or an old hand, and the most powerful. A full on-line help menu makes using Crosstalk® for the first time a snap. It can turn your PC into a terminal on a mainframe computer with its powerful terminal emulation feature. It will even operate your PC when you're not there. You can call into an information service such as The Source or Dow Jones News Retrieval, or transfer files and electronic mail, all at the touch of a button. The Half Card™ connects your computer to the world. Effortlessly.

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What's Inside

Keeping on top of TopView was quite a challenge, especially considering the deadlines involved, but our reviewers managed to get the dope on this new multitasking package from IBM.

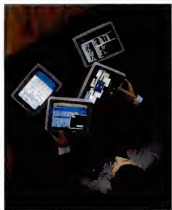
Most of our readers probably assume that a sense of excitement pervades the air when a new, innovative product reaches the offices of *PC Magazine*. Well, you wouldn't be far wrong—except that the sense of excitement is more often a sense of pure, unadulterated panic. Why? Because of that insidious bane known as the deadline.

I'm sure that most of our readers are familiar with the problems of the deadline. How often have you sat back comfortable in the knowledge that you had until May 15 to complete a project, only to realize that May 15 was about 20 hours away? Or suddenly discovered that your boss had decided that the deadline could easily be moved up a couple of weeks without "inconveniencing" anyone? Just the memory makes your head spin, doesn't it?

Well, situations like these that raise the blood pressure are extremely familiar to the *PC* staff. Not only do we have to investigate, evaluate, and write up the usual last-minute stories that come up—after all, we *are* journalists—but we also labor under a special disadvantage: IBM's penchant for coming out with new products, announcements, and so on, just when it is most inconvenient to the magazine.

Staff Mobilization

Take TopView, for instance. We've known for a while that IBM's new multitasking DOS shell was on its way, and we've listened to speculations about its effect on the market for several weeks



now. Peter Norton even did a preliminary review of it in the November 13, 1984, issue of *PC*. It was obvious that TopView would be a prime candidate for a *PC* cover story.

However, we didn't predict (though we should have) that IBM would call us about a week before the final editorial deadline for this issue to tell us that it had our copies of TopView all ready and ask if we wanted to see them. (That's a little like showing a 10-year-old a Cabbage Patch doll and asking if there were any chance the child would like to have one.)

PC's editors immediately went into high gear. Editor Bill Machrone recruited executive editors Paul Somerson and Mike Edlhart, associate editor Stephanie Stallings, and free-lancer Bill Catchings and put them on a state of alert. Assistant managing editor Luisa

Simone prepared herself for a week of intense nudging ("Bill, where is that article you promised me 2 hours ago? And don't forget the sidebar."!). Technical coordinator Mike O'Cone placed himself squarely in front of the Toy Shop door, arms folded across his chest, and swore that nobody—repeat *nobody*—would take any peripheral out of there unless he signed for it in blood.

Then the IBM folks down in Boca Raton called and said there would be a slight delay.

Machrone and Edlhart immediately got on a conference call. What was the reason? Last-minute bugs? A heavy snowstorm? A flood in the warehouse? No, said the IBM representative regretfully, none of those. They were simply dissatisfied with the packaging of the product and thought that *PC* wouldn't mind waiting until that little problem was resolved.

It didn't take long to convince IBM that beauty was in the eye of the beholder; please, please, please, send us our copies now!

Once TopView showed up at the office, everyone grabbed his copy and went to work. O'Cone and editorial assistant Dave Baker were totally overrun as editors piled into the Toy Shop, madly searching for copies of the software packages said to be compatible with TopView. Baker found himself cleaning months of dust and cobwebs off of back shelves as editors who normally disdain any type of nonkeyboard input now clamored for compatible mice. Bill Machrone, like a true New Yorker, com-

WHAT'S INSIDE

pared the ensuing scene to "Macy's the day before Christmas."

Eventually, of course, silence ensued, broken only by the occasional whir of disk drives and a muffled curse from

some unfortunate who was trying to use TopView with a keyboard rather than a mouse. But perhaps I should stop here and let the reviewers of TopView do their own talking.

Editorial R&R

Another disadvantage to deadlines is that once they have been passed (assuming, of course, that the task involved was completed), the staff usually needs a short period of time to "wind down." For example, some of PC's staff was seriously worried about the emotional health of our copy edit department. Since the copy editors are the last to receive a manuscript before it goes to the typesetter, they are also usually in a state of more or less perpetual panic.

In order to alleviate that distress, management recently presented the staff with its own microcomputers—ostensibly for use as aids to the editing process. In order to check on what effect the computers

It was obvious that TopView would be a prime candidate for a PC cover story.

were having, one of our associate editors recently strolled past the copy edit offices. She was pleased to hear the babble of excited voices vociferously debating some abstruse point of grammar. Curious to know which manuscript had prompted such excitement among the normally serene copy edit staff, she wandered into one of the copy offices to find on the screen *Trivia 101*, a game that had gone through the reviewing process and had found its way into the eager hands of the staff.

"Well, after all," explained one of the participants blithely, "in order to edit the review properly, we've got to have a thorough knowledge of the program, right?"

Well, at least we now know that morale is up.

Beyond Trivia

If you don't go in for computerized trivia games, you may be more interested in John Dickinson's review of IBM printers or Martin Porter's close look at the role of the Compaq personal computer in artificial heart implant procedures.

But before you go—what was the largest U.S. city in 1885?

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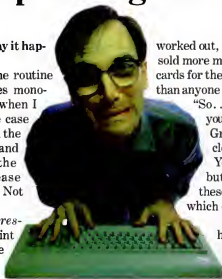
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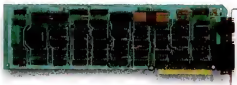
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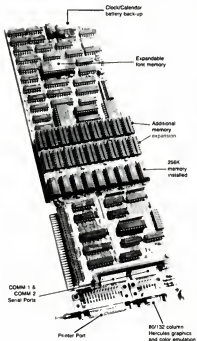
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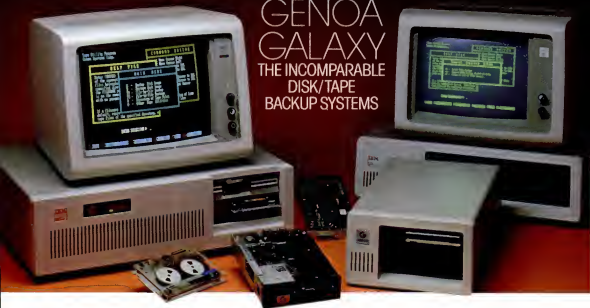
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CIRCLE 126 ON READER SERVICE CARD

IN News

FROM THE EDITORS OF PC

April 30, 1985

WILL IBM FILL GAP?

Insiders say that a new tape drive backup is on the way.

CLEVELAND—With press releases about new streaming tape backup units cascading over the transom like a waterfall after the spring thaw, few are special enough to win PC's attention. However, a new trio of fast and sturdy tape units from Tecmar proves the exception. Tecmar's production of tape backups is noteworthy not only because it represents a move into a new field by a large PC peripheral maker that so far has avoided tape, but because the rumors started rolling in even before the first units were rolled out.

IBM, whose sole backup product has been the floppy disk, was reportedly close to signing (or had already inked) a deal with a large aftermarket supplier for tape backup units. Three names surfaced and twined through the rumors like noodles in a murky chicken soup: Colorado Memory Systems, Wangtek, and Tecmar.

Coincidentally, Tecmar's press release indicated that its new drives were developed by Colorado Memory Systems around Wangtek's half-height tape drive. Tecmar will do the manufacturing (assembly) and reportedly is the sole licensee of the software and hardware (although Colorado Memory Systems has the right to manufacture the unit).

Three Models

Tecmar offers three models that share the same Colorado

Memory Systems software. The QIC/60H is a standalone dedicated backup tape drive based on Wangtek's 1/2-inch cartridge

on a DC-600A tape.)

The QIC/60W20 adds a 20-megabyte hard disk in the same chassis. And the QIC/60AT is a



Tecmar's new QIC streaming tape backup system.

tape transport that uses nine tracks and serpentine (back-and-forth) recording to store 45 megabytes on a single 3M Company DC-300XL cartridge (60

bare half-height Wangtek drive combined with a controller designed to fit in the PC AT chassis under the A: floppy disk drive. Although the QIC/60AT

controller does not use the AT's expanded 16-bit data bus, Tecmar does not specify its installation in other IBM personal computers because the drive requires peak wattage that might cause disk errors in smaller systems with flimsier power supplies.

PC's Cleveland-based writer, Winn L. Rosch, borrowed one of the first units off the assembly line and reports it to be the fastest tape unit he's tested. He attributes its speed to the Colorado Memory Systems software.

Menu-driven with on-line help, the units' software allows DOS-image backup, which copies to tape only the hard disk area actually used and can restore it to the same or another

(continued on page 42)

Operating System Links Macintosh to IBM PCs

BY STEVE ROSENTHAL

BERKELEY, Calif.—IBM PCs and Apple Macintoshes can now share data on-line as easily as they can copy files from disk to disk. Centram Systems, a Berkeley-based firm, has started public demonstrations of a low-cost network that connects IBM PCs, Apple Macintoshes,

and Apple's new LaserWriter printer, allowing file exchange between normally incompatible machines.

The Transcendental Operating System (TOPS) permits each computer on a network to access files on the disk drives of any other system. The network

can be used to link PCs or any combination of PCs and Macintoshes to Apple's new LaserWriter laser printer. Centram has been demonstrating the system since the middle of February, with customer shipments slated for late spring.

(continued on page 34)

Screens Announced By Data General, Morrow

Improved Sales Expected

BY CHARLES BERMANT



The DATA GENERAL One

WESTBORO, Mass.—Less than 6 months after its introduction, Data General has upgraded and improved the liquid crystal display (LCD) screen of its portable desktop computer.

The DATA GENERAL One, which boasts full PC power in a near-laptop format, has been widely criticized for its hard-to-read screen. At the time of the screen upgrade, which enhances the image quality and also allows the screen's angle to be adjusted, fewer than 10,000 machines had been sold.

The new screen incorporates a reverse polarization process that increases the contrast between screen characters and the background. In addition, the screen lens has been removed.

PC Magazine contacted five Data General dealers at random about the new screen. Those who had received the upgrade said that it was a needed improvement and that it would make the unit easier to sell.

Better Reviews

"Reaction to the new screen has been very favorable," says dealer Kevin Speid, sales manager of Wolf Computing in New York City. "The difference is like night and day. Some of my customers had trouble with the original screen. I went right to them with the new one and turned it into sales."

"As portables go, it's a good screen," says Sheila Cox, office manager of Ace Computer Systems in Atlanta. "But it still

needs some work.

The move will not affect the DG/1's \$2,895 base price, but the new screen carries a \$350 cost for current users wishing to upgrade. Jeff Bartman, public relations manager for Data General's desktop division, said that the company was taking a loss by offering the upgrade at this price. He added that dealers have been given the latitude to offer the upgrades to their customers for less.

Promises Kept

Upon introducing the DATA GENERAL One last fall, company spokespersons said that screen readability would soon be improved. Scott Smith, systems consultant for JFM Business Systems in Chicago, says that many large companies want to make a commitment to a specific portable computer for corporate use and that making the DG/1 a stronger product would position it as a top contender for these accounts.

"Those who bought it needed portability and didn't find the screen a big problem," says Bartman. "We said that we'd utilize new technology and improvements as they became available. But the screen has been the big issue."

Across the country, Morrow Computer in San Leandro, Calif., increased the screen readability of its portable Pivot computer in early February with an improved backlit LCD. Current owners can upgrade for \$100—which spokesman John Seamster said was "at cost"—and unit prices were cut \$1,000. Seamster said these actions were paving the way for a 29-line Pivot system to be introduced later this year.

Both companies' actions came on the eve of several laptop machine product announcements, possibly including one from IBM.

Links (continued from page 33)

According to Centram president Nat Goldhaber, TOPS is the first "transparent" network for either PCs or Macintoshes, a true distributed network, the lowest-cost network for linking PCs to Macs, and possibly the lowest-cost network available for linking PCs.

By transparent, Goldhaber explains, he means that once the network software is loaded into each machine, no special procedures are needed to access remote programs or files. A directory on an IBM PC, for example, appears as another disk drive to a Macintosh. The Mac's disk drives, in turn, are just other drives to the PC.

Easy Moving

Files can be moved between computers just the way they are moved between volumes within a single computer—with the COPY command on the PC or by pointing and dragging the appropriate icon on the Macintosh. Programs can access files on other machines just the way they access other disk drives. Files created on the PC are automatically assigned icons on the Mac. Macintosh files show up as ordinary text-based filenames on the PC, without their associated images.

The network requires no central hard disk for a file server or dedicated controller, relying instead on the combined efforts of the software and hardware distributed across the entire network. Both files and programs can be stored on the disk drives of any machine. In fact, pro-

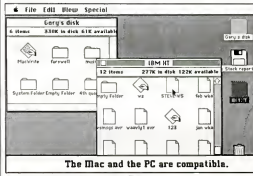
grams can be stored on one machine and run on a second using data from still another, even if the machine providing the storage is a different model.

Centram expects its version, complete with TOPS, to sell for under \$100 for machines such as the Macintosh that have AppleTalk hardware built in and for under \$300 for machines like the PC that need special network cards.

Centram has been wooing Apple for some kind of joint venture or licensing and has centered its system around the AppleTalk network. However, the TOPS network can also be used to connect solely PCs, still at a cost of under \$300 per node. The file transfer software still works, with each PC able to access files stored on the drives attached to other network machines.

In its initial release, TOPS only ships files among computers—each system is still responsible for making use of the data once it gets there. According to Michael Pflaumer, Centram's resident technical wizard, this should be less of a problem as time goes on.

Centram's plans are ambitious and far in advance of other announced products. The product is definitely not vaporware, but some work remains to be done on the user screens, manuals, packaging, and interface boards before the product can be released. If it can ship to users as well as it can ship files between computers, though, Centram's TOPS ought to be well worth watching.



A screen print showing the Mac linked with an XT.

Kaypro Unveils AT Clone

SOLANO BEACH, Calif.—They're here! The AT clones have officially arrived. And, as reported in the last issue of *PC*, the Kaypro Corporation won the race to produce a PC AT workalike, beating its own corporate timetable by about a month.

Unveiled here February 25, the Kaypro 286i, like IBM's top-of-the-line personal computer, uses an Intel 80286 microprocessor running at 6 MHz, includes a socket for an 80287 floating-point coprocessor, and sports an 84-key AT-workalike keyboard with bidirectional interface. Like the AT, it also offers a real-time clock/calendar with lithium battery backup.

Unlike the AT, the Kaypro 286i is not available with a hard disk. Instead, the new machine comes standard with two 1.2-megabyte floppy drives.

David Kay, vice president for



The Kaypro 286i

marketing and son of company founder Andrew Kay, rationalized the absence of high-volume storage by pointing out that buyers of the 286i could select a hard disk from a variety of third-party vendors and could drive such a disk with the 286i's on-board controller card. Other Kaypro personnel, who asked to remain unnamed, pointed out that the absence of the hard disk enabled Kaypro to get its ma-

chine to market ahead of the competition.

Kay said the company had no plans to offer a hard disk at any point in the future.

More Memory

Standard memory on the 286i is 512K, double that of the AT. Users may extend their systems to 640K on the motherboard and to a whopping 15 megabytes by installing third-party expansion cards.

The 286i offers eight input/output slots, three of which are already in use in the standard configuration. One of the standard cards is an AT-compatible color/graphics adapter with RGB output. The maximum resolution this card permits is 640 × 200 pixels.

Like previous Kaypro computers, the 286i comes bundled with a packet of MicroPro application software, including *WordStar*, *MailMerge*, *InfoStar Plus*, *CalcStar*, and *MicroPro's Tutors and Lessons*—an interactive training set for the other applications.

The 286i also comes bundled with Microsoft's GWBASIC, the generic equivalent of IBM's Advanced BASIC. Like the AT, the new Kaypro will run PC-DOS versions 3.0 and 3.1. Operating system software is not provided with the machine.

The 286i, like the rest of the Kaypro line, is dressed in basic black, but the company seems to be going for a slightly sleeker look these days. The battleship-gray severity of earlier Kaypro models has given way to rounded edges and corners, and there's even a sexy chevron-shaped grille on the front of the 286i's system unit.

The retail price for a 286i with standard equipment has been set at \$4,550, some \$1,200 below that of a comparably furnished PC AT. An RGB monitor, styled to match the Kaypro system unit, is available at extra cost. The 286i is covered by a 1-year warranty. Kay said his company expects to be shipping 400 units a month by mid March.

—By Craig Stinson

Stocks Go Sky High With PC-Satellite Link

BY JAMES LANGDELL

NEW YORK—You may soon find stock prices buried in "Sesame Street" that are more current than Financial News Network's televised ticker.

Last year IBM and Merrill Lynch formed International MarketNet (IMNET), a joint venture to develop a PC-based workstation for investment professionals. One part of this system that may attract brokers is its ability to transmit stock price data to a user as soon as a transaction appears on the ticker. Now IMNET has struck deals with two partners that can provide it with channels to broadcast stock data over the air.

IMNET's first deal is with the Public Broadcasting System, which brings to the relationship a communications satellite connection with its 300 member

television stations. To supplement the PBS system, IMNET also called on the satellite broadcasting technologies of Equatorial Communications Co., a Mountain View, Calif. company that was the first to develop small (2-foot wide) receive-only dish antennas.

Through its PBS connection, IMNET will package and encrypt stock ticker and news data and communicate it to the PBS headquarters in Washington, D.C. From there, the data will be transmitted as part of PBS broadcasts that are fed by communications satellite to its member stations around the country.

Sharing the Line

IMNET's data will be carried on three of the 21 vertical



A 2-foot dish links PC's to satellites.

blanking interval (VBI) lines not already used by PBS for its picture and sound transmissions. IMNET plans to deliver data at a rate of 15,000 bits per second on each VBI line. The local PBS station's signal can be picked up by a television antenna attached to an IMNET customer's PC. A special board (yet to be developed by IMNET) inside the PC will extract and decode the received data to allow the financial software to display and process the latest stock prices.

IMNET's other transmission system will transmit the same data via Equatorial's transceivers based on two communications satellites (Galaxy 3 and

Weststar 4), beaming directly to miniature 17-pound dish antennas mounted on roofs, walls, or windowsills near the IMNET customers' PCs. Each dish antenna can serve up to four IMNET workstations.

The full IMNET system is driven by a *Financial Services System (FSS)* software package that runs under IBM's TopView window environment. Through FSS, a user can specify up to 300 stocks that the program will automatically monitor, storing and displaying data on their transactions as they occur. Within TopView's multiple windows, FSS can display current stock prices, the ongoing ticker, news reports, and other information.

FSS will be available in mid-1985 on a system built around IBM's 3270/PC. This will be marketed to brokerage firms (including Merrill Lynch itself) by branch offices of International MarketNet at Two Broadway, New York, NY 10004, (212) 510-1500. IMNET has not set prices for any of these products. ■

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TO C OR NOT TO C IS THE QUESTION

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F - FARES A - AVAILABLE FLIGHTS

"Travelshopper" can book flights using TWA's on-line reservation service.

tions and purchase tickets, which are then sent to your travel agent or directly to your home. In either case, there must be a travel agent of record, who will, of course, receive credit for the sale. You can avoid using a travel agent by arranging to have your tickets waiting for you at the airport.

In addition to CompuServe's \$39.95 subscription fee and standard connect charges (\$12.50 per hour in prime time and \$6 per hour in non-prime time), Travelshopper users are charged an additional connect surcharge of \$20 per hour during prime time and \$15 per hour during non-prime time.

For more information about Travelshopper, contact CompuServe, 5000 Arlington Centre Blvd., P.O. Box 20212, Columbus, OH 43220, (614) 457-8600, or TWA, 605 Third Ave., New York, NY 10158, (212) 692-3120.

Vegas Line On-Line? . . . Another new CompuServe on-line information service is **TeleSports**, which, according to its president Jim Beane, fulfills a "tremendous demand for up-to-the-minute sports information," with as many as five sports news updates an hour.

CompuServe's Richard Baker points out that subscribers can now "know immediately about weather changes or injury reports before or during a game that may affect the outcome." If that information seems too specialized, consider that the service offers not only the expected scores, schedules, and statistics, but also the latest point spreads and team match-up analyses.



Jim Beane

Turbo Tourney . . . In this college tournament, teams score with computer programming rather than with in-your-face slam dunks.

The Association for Computing Machinery is sponsoring a "Scholastic Programming Contest" in which college teams spend 5 continuous hours programming with Borland International's *Turbo Pascal*. The survivors of the regional tournaments are meeting in New Orleans to decide a winner from the final 28 teams. We'll let you know who won in a future issue.

Disk United . . . The merger of Xidex Corp. of Fremont, Calif., and Dyan Corp. of Santa Clara could seriously challenge Verbatim Corp.'s position as the top manufacturer of floppy disks. Bert L. Zaccaria of Xidex says Dyan's and Xidex's strengths are complementary and claims the merger will give Xidex an 18 percent share of the floppy disk market. "This puts us just slightly behind number one Verbatim, and gaining," he says. The company also claims it is now the leader in micrographics, software duplication, and rigid disk manufacture.

Lotus Development Agreement . . . Two employees left Lotus Development Corp. to start new companies. But now they're back—in a way.

Lotus has entered an investment agreement with Peter Gable's Arly, an artificial intelligence company, and a software development agreement with Ray Ozzie's Iris Associates, Inc., which is developing a new form of productivity database. Both company heads formerly worked for Lotus.

Mitchell D. Kapor, chairman of Lotus, says that the partnerships will enable Lotus to develop new productivity tools and that Lotus will continue to selectively support startup efforts of former employees. Most of the company's product development efforts will remain within Lotus Development Corporation.



Mitchell Kapor

dWorld Is Our dBASE . . . Framework and dBASE II aren't just for Americans anymore. Ashton-Tate, the Culver City, Calif. manufacturer of these best-selling business products, has been vigorously expanding its marketing efforts worldwide.

Among other recent overseas activities, Ashton-Tate has:

- Signed a multimillion dollar distribution deal with ACT, Britain's leading microcomputer manufacturer.
- Inked a \$10 million distribution agreement with French software distributor La Commande Electronique.
- Named Sistemas Gerenciales Aplicados as its distributor in Mexico.
- And, closed a \$2.7 million deal with Editrice Italiana Software to distribute Ashton-Tate products in Italy.

Since Ashton-Tate executives obviously have their collective eye on increasing their international distribution and sales, one can certainly imagine that they might think "dWorld is their dOyster."

—edited by Jane Mintzer, with Don Kennedy

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Gap (continued from page 33)

physical drive, as long as the sizes of the DOS partitions on the source and target drives are the same. With a small speed penalty, it can also back up files individually or in groups, including subdirectory searches.

Logical Additions

No one at IBM, or at the three companies mentioned as suppliers would confirm the rumored link. However, industry analysts point out that IBM has increasingly been criticized for its failure to offer a tape backup system. With IBM hard at work answering the other criticisms of its personal computer products, and with tape backup considered a necessary adjunct of the company's networking strategy, a backup system would be a logical addition to the company's product line.

Doug Cayne, analyst and vice-president of the Gartner Group, reacted to this latest spate of speculation by saying, "It's more logical good sense to expect that IBM will provide something because it's such a growing problem. The only question is whether it will be a separate unit, be one built into the chassis like the hard disk on the XT, or be part of the network system."

Given the sturdy, almost over-built construction of the new tape units, the reputations of the manufacturers, and the immediate need for fast, large-capacity backup that the AT is certain to create, it's likely that you may find the new Teemur drives in your IBM product center very soon—either under their maker's name or a label that matches the sign in the window of the store.

For now, the QIC/60AT 60-megabyte streaming tape drive for the AT lists for \$1,695; the QIC/60W 20-megabyte tape drive with a 20-megabyte Winchester drive costs \$3,495; and the QIC/60H external 60-megabyte tape drive with controller is priced at \$1,995. All QIC drives are designed around the QIC-24 format.

—contributors to this report:

Don Kennedy, James Langdell,
Winn L. Rosch, and
Craig Stinson

A First Look at the QIC/60 Series

The Teemur QIC/60 series of tape drives can store up to 256 separate backups on a single 60-megabyte tape cartridge. A backup may be either a "mirror-image" duplication of an entire floppy or Winchester, or a file-by-file copy of selected elements on a disk. The system writes a master directory on the tape that lists all backups by date and time, size, type (mirror-image or file-by-file), and user-supplied description. For each file-by-file backup, it also creates a separate alphabetized directory showing file names, sizes, and so on.

QIC/60 series backup drives are driven either from a menu tree or by DOS commands. The menus (which come with context-relevant help screens) appear to be straightforward

enough for relative novices to follow without trouble. The command-line approach, which will require some study even on the part of experienced PC users, permits more flexibility in the specification of files to back up or restore. It also lets you create batch files to carry out routine backup procedures.

Here are just a few of the software's interesting features:

The image-restore program performs a "smart reallocation" of any bad sectors found on the backed-up disk. This means that even if you back up from one Winchester and restore to another, you don't need to worry about writing good data onto bad sectors.

The system lets you back up files selectively in accordance with date criteria, archive sta-

tus, wildcard filename specs, and other factors. You may also restore selected elements of a backup, either by way of command-line switches or through a query-and-confirm procedure.

The disk to which you restore needn't have the same directory structure as the one from which you backed up. If the system doesn't find directories matching those that were backed up, it will create them as it restores.

When backing up, the system will—if you choose—report how many times it had to re-write data following a verify error. This information can be your signal to replace an aging cartridge. The system will also tell you how often during a backup it had to stop the tape to allow the disk to catch up; this information may help you decide when to "repack" your disk to eliminate file fragmentation.

—Craig Stinson

Quadram Joins Portable Market

BY VIRGINIA DUDEK

ATLANTA—IBM compatibility has found its way to portability through Quadram Corp.'s recently announced Datavue 25.

The Datavue 25 is billed as handling "everything you use a desktop PC for," according to Leland Francis, president and chief operating officer of Intelligent Systems. Quadram's parent company, Datavue 25 runs MS-DOS and includes a 360K floppy disk drive, an LCD display, and 128K bytes of user memory expandable to 640K.

The screen is a full-sized, 80- \times -25-line monochrome display with a graphics mode that uses four shades of gray. The screen tilts to six different positions. Resolution is 640 \times 200 pixels, or 320 \times 400 when the graphics mode is used. Strange noted that revised display screens would be available by late summer.

The system has one 5.25-inch



Quadram's Datavue 25

disk drive with a formatted capacity of 360K. It also comes with RAM drive software for floppy drive emulation. "With the RAM drive you do not need a second drive for most software," says Strange. "It can run 1-2-3 faster with one drive than with two."

An expansion chassis is available for full-sized IBM expansion cards and a Winchester

drive. Strange adds that the only limitation with the one-drive configuration is that a program that uses up a lot of memory, such as Lotus's *Symphony*, would require additional disk drive support. In addition, the system allows for flexibility in labeling the disk drives.

The system weighs in at 14 pounds, somewhere between luggable and ideal. Power is supplied by an AC adapter or rechargeable battery pack, allowing the system to run for 1 1/2 to 3 hours without being recharged. A RS-232C interface and a Centronics parallel port are standard. A second floppy drive can be added, and Quadram will be able to configure the system with 3.5-inch drives as they become more widely used. Strange also stated that Quadram will be shipping a modem for the Datavue 25 sometime in May.

The 83-key keyboard is cordless, has ten function keys, and operates with infrared technology. The 128K version costs \$2,195, and the 640K version is \$2,795. Quadram began shipping the Datavue 25 in early February and is distributing it through retail, OEM, and VAR channels.

BUYERS GUIDE TO DESKTOP ORGANIZERS

A COMPARISON OF THE MOST POPULAR PRODUCTS

	PolyWindows Desk	Sidekick	Spotlight
ROLODEX-TYPE FILES			
Variable Card Size	YES	NO Files	NO
Multiple Card Decks	YES (1-10)	NO Files	YES
Number Cards Per Deck	RAM Limit	NO Files	500 Max.
Max. Characters Per Card	960	NO Files	480
Search	YES	NO Files	YES
Auto Alphabetize	YES	NO Files	YES
Print Card	YES	NO Files	YES
Print Deck	YES	NO Files	YES

CALENDAR			
Daily Notes	YES	NO	NO
Mark Important Days	YES	NO	NO
Date Range	1752-2099	1901-2099	1901-2099

APPOINTMENT BOOKS			
Multiple Appt. Books	YES (1-10)	NO	NO
"Things To Do" List	YES	NO	NO
Print Appointment Book	YES	YES	YES

ALARM CLOCK			
Display Time	YES	NO Alarms	YES
Hourly Chimes	YES/Optional	NO Alarms	NO
Time Format	AM / PM	NO Alarms	AM / PM
Display Alarm Message	YES	NO Alarms	NO
Number of Alarms	9	NO Alarms	Many

CALCULATOR			
On-Screen Tape	YES/Optional	NO	NO
Printing Tape	YES/Optional	NO	NO
Percentage Function	YES	NO	YES
Display With Commas	YES/Optional	NO	NO
Floating/Fixed Decimals	YES/Both	Fixed	Floating
Memory	YES	YES	YES
Insert Result in Work	YES	YES	YES
Max. Display Digits	15	18	12
Display Number > Above	YES/Exponential	NO	NO
Scientific Notation	YES	NO	NO
Binary/Hexadecimal	NO	YES	NO

NOTEPAID			
Multiple Documents	YES (1-10)	NO	NO
Word Wrap	YES	NO	YES
Merge Files	YES	NO	NO
Change Margins	YES	NO	NO
Variable File Size	YES	YES	NO
File Size Limit	64K	50K	4.4K
Variable Window Size	YES	YES	NO
Print Document	YES	YES	YES
Print Window Only	YES	YES	YES
Undelete Key(s)	YES	YES	NO
Cut & Paste Screen Text	NO (Note 1)	Import Only	NO

KEYBOARD ENHANCER			
Number Keys Redefined	YES Up to 60	NO/Not Avail.	NO/Not Avail.
Total Keystrokes	YES 2500	NO/Not Avail.	NO/Not Avail.

GENERAL CHARACTERISTICS			
100% Memory Resident	YES	NO	NO
Minimum Memory Used	47,500	61,300	77,200
Typical Memory Used	50-75K	61,000	77,200
On-Line Help	YES	YES	YES
Movable Windows	YES	YES	NO
Redefine Colors	YES	YES	YES
Expandable/Add Functions	YES	NO	NO
Can Remove Functions	YES	NO	NO
Integrated Interface	Excellent	Good	Good
Visual Appeal	Excellent	Fair	Poor
Speed	Very Fast	Fast	Slow

ADD-ON FUNCTIONS			
Auto Dialer	NO (Note 2)	YES	YES
DOS Functions	NO (Note 1)	NO	YES
Game	YES	NO	NO
ASCII Chart	NO	YES	NO
COST - PROTECTED	\$48.95	\$54.95	\$149.95
COST - UNPROTECTED	\$84.95	\$84.95	NO/Not Avail.

Note 1: "PolyWindows DOS" add-on available soon at extra cost to add cut & paste and many additional functions.

Note 2: "PolyWindows Phone" add-on available soon at extra cost to add auto-dial, phone log, cost computation, etc.

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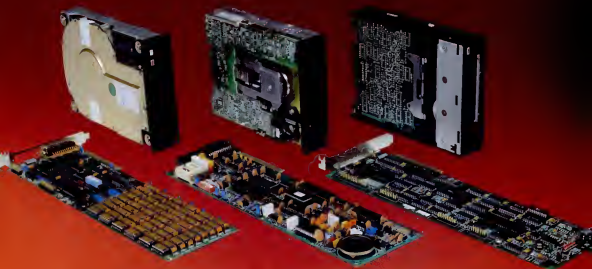
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CIRCLE 158 ON READER SERVICE CARD

A Better Word From Microsoft

Version 2.0 corrects earlier problems.

BY JOHN DICKINSON

Microsoft's new version of its best-selling *Word* word-processing program offers improved speed, an array of new features and options, improved documentation, and a 30-day money-back customer-satisfaction program perhaps unique in the software industry. Best of all, the 2.0 version costs no more than the original *Word*'s \$375 price.

Improved speed is the new version's most noticeable advancement. Screen speed is the key for many word processing users, and older versions of *Word* were lackadaisical at best, particularly when run in the "what you see is what you get" graphics mode that displays italics, underline, and bold on a color graphics screen. While not the fastest word processing program in the industry, *Word*

2.0 is swift compared to its earlier releases.

I ran the new *Word* on an AT equipped with IBM's new Enhanced Graphics Adapter and Monitor (EGA/EGM), and my only screen-speed complaint came when I scrolled through large documents: the screen motion became "bumpy." This is partly because *Word*'s file-management scheme leaves parts of the document on disk.

Colorful Choices

A pleasant addition in *Word* 2.0 was the graphics support of the EGA/EGM setup. The program uses the new screen to give you a color background in graphics mode (with 15 choices), which makes the screen much easier to read than the "black only" background favored by older versions of

Word. Unless you have the extra memory options for the EGA/EGM, the new screen's characters are about the same resolution as those on the older screens. While italic, boldface, and underlined characters are displayed, proportionally-spaced characters are not.

My own choice for screen configuration was the EGA/EGM set in text mode, where the new *Word* offers the same 15 colors for background and uses color and intensity to display italic, boldface, and underlined characters. This configuration also operates faster (although it still bumps when scrolling), and it is easier on the eyes. You can see exactly what you're getting by exiting the program and returning in graphics mode (*Word*'s ability to remember the last document you were editing is handy for this purpose).

A common complaint about older versions of *Word* was the constant presence of the menu at the bottom of the screen. *Word* 2.0 lets you remove the menu, freeing two additional lines for text. The only serious reservation I have about *Word*'s new screen is that I couldn't find a way to get a single-spaced display of a double-spaced page format.

Document formatting and printing have always been one of *Word*'s strong points, and new features in version 2.0 make them even easier. You can now control page breaks during the pagination process, while previous versions required you to insert hard page breaks where needed. Another feature that helps formatting is a built-in hyphenation program. The program uses Knuth's algorithm to perform hyphenation, and it works more quickly than dictionary-based programs. The program gives you the opportunity to confirm or change each proposed hyphen position.

Another new feature is a revised spelling checker. The 80,000-word checker works on the current document or on one from your disk, and you can run it outside of the *Word* environment. Both new features, and a word counter included on the utility disk, are based on Oasis Systems' *The Word Plus* package. A "library run" facility can be used to run any external program, including batch files.

Word's new style sheets contain standard formatting scenarios for one or more documents. You are free to modify them, make your own, or avoid style sheets altogether. They're a bit difficult to get used to, so you

Microsoft's Word: Just My Type

Microsoft's *Word* is a powerful word processor, but can it typeset? In the PC marketplace, the closest thing to an affordable typesetter is the Hewlett-Packard LaserJet printer. The HP LaserJet has a built-in 10-pitch Roman font that makes it a fast, quiet replacement for common impact printers such as the Diablo 630. However, optional plug-in font cartridges enable the LaserJet to do much more. It supplements the built-in fonts with 10-point proportionally spaced Times Roman plain, bold, italic, and small caps—plus Helvetica bold and a monospaced Courier font.

The answer to the question "Is the LaserJet truly a typesetter?" has to be "No," but it's hard to think of a more powerful

word processing pair than the new *Word* and an HP LaserJet. People who produce slick periodicals or professional books

onal font cartridge. It contains the built-in font in point proportions Times Roman plain, italic, and small caps. Helvetica BOLD, monospaced Courier

Left, type formed by *Word* with a LaserJet. Right, magnified 400 percent.

really need typeset quality, and they won't get it using *Word* and a LaserJet. However, many others have in-between requirements that demand more than an ordinary printer, yet less than a full typesetter. Producing tech-

nical manuals, newsletters, or in-house reports are ideal jobs for the *Word*/LaserJet duo.

I spent about half an hour learning to produce a multi-

space
BOLD

column, proportionally spaced document. When you enter multicolumn text, *Word* displays just one column on-screen even though the printed output will be multicolumn. I used vertical windows so I could see

more of my document at once. Alternatively, I could have entered the text in single-column mode and then invoked the multicolumn mode just before printing.

There are several important capabilities that the *Word*/LaserJet combo can't deliver. Type-size changes are impossible because the Times Roman font in the 92286B font cartridge is just one size: 10 point. (True typesetting would require point sizes from about 6 to 24 points, depending upon the application.) Another missing element is microjustification (microspaces between the letters of the words). Although the *Word*/LaserJet twosome may not be a true typesetter, it's one of the best duets in the business.

—Kare Christian

A Word on the Macintosh Word

Microsoft's *Word* for the Macintosh is surprisingly tame. It has several deficiencies compared to the version of *Word* available for the PC and only a few advantages over Apple's own *MacWrite*. Some think that *Word* for the Macintosh might serve as a symbol of Apple's power. I think it confirms a gloomier suspicion—Apple's innovative Macintosh computer works as an applications funnel. There are very few unique ways to approach a project on the Macintosh. All of the applications look and act much the same.

The Macintosh version of *Word* seems easier to use than the PC flavor. The Macintosh

screen is sharper (but smaller) than most PC displays, and *Word*'s pull-down menus are snappier and better organized on the Mac than are the menus on the PC. The Macintosh is also better able to show various sizes and styles of characters on the screen, and it has the ability to include pictures in a document.

However, *Word* on the Macintosh lacks many features that contribute to the PC version's success. The Macintosh version lacks style sheets, it lacks a spelling checker, and it has to contend with the Macintosh's meager keyboard and slow speed. Macintosh *Word* has fewer printing options, and it

doesn't have any built-in file-management commands. Although Macintosh *Word* does have keyboard commands to perform most of its operations, I found them hard to use, and I ended up relying too heavily on the mouse. On the PC, I used the mouse less because more commands (especially for cursor movement and scrolling) were easily accessible from the keyboard.

Differences in Operation

Although the underlying philosophy of Macintosh *Word* is similar to PC *Word*, the detailed operation and organization of the two programs are very different. I wouldn't recommend mixing PCs and Macs in one environment while expecting ev-

erybody to be able to use *Word* fluently on both machines—their layouts are too different. I'm an experienced PC *Word* user, and I was surprised at how long it took me to adapt to Macintosh *Word*. I understood the Apple version of the program immediately, but it took an hour or two to learn to use it fluently.

I've admired and used *Word* on the PC because of the way it helps to manage and control the style of my documents. It is important to me to be able to reformat my documents without spending hours doing *WordStar*'s Ctrl-B jig. *Word* works well on the Mac, but not much better than *MacWrite* does, and not as well as *Word* on the PC does.

—Karee Christian

may not want to use them, but they do help you produce consistently formatted documents.

Contemporary Support

Word supports several new printers, including the Hewlett-Packard LaserJet, Apple's new laser, and IBM's latest thermal and daisy-wheel offerings. Printing is generally excellent and trouble-free using *Word*. The program ran my Diablo-compatible Primages 90 and a Hewlett-Packard LaserJet as if it knew every last thing about the machines. *Word* can produce proportionally spaced, justified column formats whether you've used multiple-column page formats or typed-in tables using the tab stops.

The only complaint I have with *Word*'s print formatting is that it doesn't put microspaces between characters inside words when justifying text (in *Word* 2.0, all microspaces are placed between words, which can result in "rivers" of white space down the page). Microsoft should offer you choice rather than forcing you to accept its own microspacing method.

Also new to *Word* 2.0 is an on-screen tutorial that easily ranks with the one supplied with Lotus's 1-2-3. The tutorial doesn't actually use the *Word* program, but it simulates it so well you'd never know it. It re-

acts to you, telling you when you've pressed an incorrect key, what key you should be pressing, and why you should be pressing it. It also notices when you haven't pressed a key lately, as if it assumes you must

be confused. When you've finished the tutorial, you're all set to boot up *Word* and get going.

Word's new speed and features haven't changed its style from Microsoft's ubiquitous menu-and-mouse orientation.

As a result, if you liked the original product, you'll love *Word* 2.0. And even if you didn't care for the original, give the new *Word* a look anyway. Its improved performance might change your mind. ■

Sold IBM-Europe Network Ready for American Users

REDWOOD CITY, Calif.—Local area networking software previously available only from IBM's European dealers is now for sale in America.

Torus Systems, Inc., announced here that *Tapestry*, its local area networking software for the IBM PC Network and 3Com's Ethernet hardware, is available from dealers in the United States. The icon-based operating environment integrates file sharing, electronic mail, a system that ties network users' names to the interoffice electronic mail, and printer sharing. In addition, *Tapestry* offers gateways to mainframes, telephone management, and an application library from which you can download PC-DOS applications.

The icon interface has an extensive multi-level help function, a feature that gives *Tapestry*

appeal for inexperienced office network users. The telephone management consists of a "Rolodex" feature and automatic dialing. The electronic mail system contains a full text editor that you access through pop-up menus. Files are password protected, and may be as-

signed any of five read/write protection levels. *Tapestry* also offers file and record lockout for multiuser file access.

Company officials say Torus Systems Ltd., in the United Kingdom, has signed a distribution agreement with IBM International Products Ltd., also in Great Britain. IBM will sell *Tapestry* through its dealers in Britain, Europe, the Middle East, and Africa. Torus U.S.A., in Redwood, will distribute the product in this country.

Tapestry runs PC-DOS 2.0, 2.1, and 3.0, and supports the IBM PC, XT, AT, and Portable computers. It requires 256K of RAM per workstation, while server stations require 320K. Server stations can be XTs, ATs, or PCs with hard disks. *Tapestry* consists of a Network Manager Pack for the network manager/server, and a *Tapestry* Workstation Pack for each PC on the network. The Network Manager Pack and the Workstation Pack together retail for \$400. —By Virginia Dudek



Tapestry uses multi-level icons.

PRODUCT REVIEW

BASIC Meets Its Waterloo

Flexibility and speed are fortes of this Canadian import.

BY JOHN M. WORAM

Editor's note: This is the fifth in a series of reviews exploring the many versions of BASIC that are now available to the personal computer consumer.

WATCOM BASIC V2.1

WATCOM Products, Inc.

415 Phillip Street

Waterloo, Ontario

Canada N2L 3X2

(519) 886-3700

List price: \$250 (US or Canadian)

Requires: No memory requirements listed, one disk drive.

The University of Waterloo Institute for Computer Research in Ontario, Canada, is a north-of-the-border mecca for computer science. Its business arm, WATCOM Products, Inc., has recently released a number of new PC language packages, including WATCOM BASIC. The language is divided into several modules on the disk, one or more of which can be omitted if your system is short of memory space and you don't need their specific features (for example, graphics, matrix functions, and the separate WATCOM editor).

Of course, there are many differences between WATCOM BASIC and Microsoft's PC BASIC, but making the transition from one to the other is reasonably painless. With a few minor changes, almost any BASIC program saved in ASCII format should run under WATCOM.

WATCOM BASIC comes with three separate manuals. The *Users' Guide* contains introductory information, system-specific details for the IBM PC, and sample programs. Many of these sample programs are stored on the accompanying disk. Sample file-handling and graphics demo programs are also included.

For example, the following program shows how to execute a loop:

```
10 X=10
20 loop
30 print X
40 X=X + 3.7
50 if X>15 then
quit
60 endloop
70 ! execution
jumps here when
X=15
80 ! use ! and not
before a remark
```

As written here, this program produces an infinite loop displaying the value 3.7 since there's a lower-case x lurking in line 40. Unlike PC BASIC and many others, WATCOM makes a distinction between upper- and lower-case variable names. Thus, xy, xY, Yx, and XY do not represent the same value (fast-and-sloppy typists please take note). Statements and commands also appear in lower-case letters.

Subbing

The *Users' Guide* also introduces procedures and calls as alternatives to subroutines, as seen here:

```
1 100 print
"Line 1"
2 110 call
```

```
Something
6 120 print
"Line 3"
3 200 proc
Something
4 210 print
"Line 2=the
Something
procedure"
5 220 endproc
7 300 print
"Line 4"
```

Although WATCOM has both STOP and END statements, in their absence, program execution still does not fall into the procedure beginning at line 200. As this example shows, the procedure can go just about anywhere you like. The numbers in the left margin beside the program indicate the sequence in which these lines are executed.

In the *Users' Guide*, the rather brief chapter on graphics will confuse many beginners. It mentions that you can select text, medium- and high-resolution graphics modes, but doesn't mention how. You're out of luck unless you already know all about intrinsic functions as well as how to read between the lines. The following line will set the graphics mode:

```
100x=mode(n)
```

The n argument may be 0, 1, or 2 for text, medium- or high-resolution. In the text mode, a similar function can be used to change the width between 40 and 80 characters.

In time, you may put aside

the PC-specific *Users' Guide* in favor of WATCOM's 271-page *BASIC Primer and Reference Manual*. This manual is divided into three sections. Although the manual's index doesn't mention it, several convenient sorting statements can be found in Chapter 5 in the Programming Language section. For example, the following little program sorts and displays 50 random numbers in the A(X) matrix, with the sort and display taking less than 6 seconds:

```
200 mat B=aidx(A)
!use didx to sort
in descending order
210 for X=1 to 50
220 print X, A(X),
A(B(X))
230 next X
240 ! A(X)=unsorted
list, already
stored in memory
250 ! A(B(X))=
sorted list
```

Like PC BASIC, WATCOM BASIC has two precisions. They are called short (4 bytes) and long (8 bytes) and are selected with an OPTION SPREC (or LPREC) statement. The maximum and minimum numbers for any computer can be seen by typing:

```
print inf, eps
```

In addition to the usual trigonometric functions, WATCOM BASIC will also return hyperbolic functions, are sines and cosines. And although it also does natural, common, or base-2 logarithms, the following lines are incorrect:

```
print log(1),
log10(1)
2.2388E-
17 9.7233E-18
```

Actually, 16 digits are seen, but in each case, the correct answer should be zero.

Better Editor

Although WATCOM programs can be screen-edited just as PC BASIC programs can, you may use an additional editor, which includes its own *Users' Guide*, to edit text files or any of

(continued on page 52)

A Slip of the Lip Sank the Chip

"A mustache hair across a chip is like a redwood tree falling through a housing project."

—An IBM manager in East Fishkill, New York quoted in "From Sand to Circuits," IBM Innovation, January 1985

"We decided waiting *another* decade for the standard in business software was too long."

Instead, Macola, Inc. has taken the Standard in Business Applications Software for *minicomputers*, from MCBA,[®] converted it to R/M COBOL for 16-bit computers, and created, we believe, the *Micro-Standard*.

Hundreds of microcomputer business applications packages from scores of programmers were rushed to market during the last ten years as the microcomputer became an everyday business tool.

Many were fine packages—filling niches, stop-gapping problems, allowing the businessperson to *maintain*—probably not drop behind, but definitely not surge ahead.

What was missing from these packages varied from package-to-package. Some lacked power. Some, simplicity. Others, clarity. Most lacked real integration.

Introducing Some *Old* Software

During those ten years, Mini-Computer Business Applications, Inc. (MCBA), was quietly establishing the standard for Business Applications Software for minicomputers.

Today, much of the new software developed by other companies boasts compatibility with MCBA's packages.

Macola, Inc., finding the current micro-packages unacceptable against the standards they sought, and realizing the time

involved in developing their own set of packages, approached MCBA, obtained the rights to convert the powerful minicomputer software, then did just that.

Thanks to Macola, the microcomputer industry can now run the *Micro-Standard* in the following financial software...

Accounts Receivable (A/R), General Ledger (G/L), Accounts Payable (A/P), Payroll (PR), Inventory Management (I/M), Customer Order Processing (COP), Bill of Material Processor (BOMP) and Assets and Depreciation (A/D).

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"Waiting ten years was worth it for software this good."



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Marion, Ohio 43302

BASIC (continued from page 50)

the other WATCOM languages.

At least one of this editor's features deserves special mention. Assume you have a library of procedures already saved on disk, and between lines 325 and 330 of your current program you discover a need for a PROC-X followed by a PROC-Y statement. These procedure statements were saved with line numbers 2000—3205 and 175—523 respectively. No problem. Type GET PROC-X and then GET PROC-Y, and you'll have something that looks like this:

```
325 ! whatever
2000 ! first
line of PROC-X
3205 ! last line
of PROC-X
175 ! first line
of PROC-Y
523 ! last line
of PROC-Y
330 ! the
remainder of the
current program
```

If you list the program (you can do so simply by typing L), the lines remain as you see them here. Now just use the RE-NUMBER command, and the complete program is properly numbered with the two procedures remaining where you want them. Just try to do that in PC BASIC.

WATCOM BASIC has many other attractive features. Here's just one more: After entering a few names into a file, just use the DOS-like TYPE command to read the file back onto the screen. No frills, but it gives the insecure an instant look at what's really there.

And here's a quick rundown of a few of the language's not-so-attractive features. WATCOM's editor makes use of the PC's function keys, while its BASIC does not. The editor's manual has no index. The DIRECTORY command lists the disk's contents but does not say how much space is left. The date, but not the time, is given in the listing. The INPUT statement will not accept a null numeric or string input. And, finally, short- and long-precision numbers cannot be mixed within one program. ■

A Day at the Races

Odds are, this handicapping program may be your best bet before you go to the track.

BY RICHARD POWELL

Editor's Note: The first Saturday in May means only one thing to sporting Americans. It's the traditional day for the running of the Kentucky Derby. In recognition of that, PC asked horse-racing expert Richard Powell to review a program that just may give you a leg up when it comes to picking the winner of this year's "Run for the Roses."

Thoroughbred Handicapping System I

PDS Sports
P.O. Box E
Torrance, CA 90507
(213) 516-6688
List price: \$129
Requires: 16K RAM.

A scientific system for picking winners? Damon Runyon's characters would have shunned it. After all, hot tips and inside information were prized commodities to those guys and dolls. However, others may want to ease the task of picking horse race winners through a system based on probabilities. And what better way to do that than on a PC?

PDS Sports' *Thoroughbred Handicapping System I* is an at-

tempt to measure the past performances of each horse in a race according to a predetermined set of standards. In theory, the higher the rating, the better the horse's statistical chances of winning the race in question.

The program instructs you to choose among the top three selections for the horse that offers the greatest overlay. If that's Race-track-Greek to you, it means you should bet on whichever of the top three horses has the longest odds. Also, PDS advises you to watch for any obvious trainer or jockey changes after you have compiled your ratings.

Rating the Contenders

The program starts by analyzing data concerning the race itself: the number of the race, the

distance to be run, and the amount of the purse.

Next, you enter information for each horse in that race. The first six entries: name of horse, starts, wins, total earnings, days since last race, and pace, seem fine. The seventh entry, track category, needs updating. Some of the tracks listed no longer run thoroughbred races and some tracks that do currently race thoroughbreds are missing from the list. Also, I feel that the numerical rating assigned to each track (1,2, or 3) is too narrow and should be expanded.

The eighth entry in the system requires you to determine the distance of each horse's best race. The problem here is that a horse's best race may have been under significantly different conditions than the race being handicapped, and the PDS documentation gives no advice on just what to look for when choosing the best race.

Speed Ratings

The ninth and tenth entries are the highest speed rating of the horse's last three races in the same distance category as today's race and on a track with the same rating as today's field.

The last two entries save *Thoroughbred Handicapping System I* from being just another routine-computerized handicapping system. It is one of the few systems I have seen that factors in the ability of the jockey and trainer.

The program, however, ignores several factors most handicappers consider crucial to understanding a race. Weight, age, and sex are crucial factors in handicapping thoroughbreds and should be included in any handicapping program.

Thoroughbred Handicapping System I succeeds as a tool for novice-to-average handicappers. A nine-race card can be computed in about half an hour, leaving you plenty of time to look for betting trends, track biases, tips, and all the other things sophisticated handicappers are supposed to watch out for at the track. And, if you're lucky, you just might win enough cash to cover the cost of the software. ■



Illustration by Norm Boydell



IMSI Presents PC Paintbrush™

With PC Paintbrush, you'll now be able to do things that you once only dreamed about.

Because, like your dreams, you'll be working with a palette of up to 256 vibrant colors and shades, depending on your color card.

And, as you'll notice, you'll also have drawing tools, drop-down menus, and a range of brush widths and shapes. Plus your choice of mouse or joystick.

In addition to freeform drawing, you'll be able to draw precise triangles, rectangles, boxes, circles and ellipses.

You'll be able to cut, paste, and move things around. Even enhance graphs, text, and images from other programs like Lotus 1-2-3, Microsoft Word, and SuperCalc 3.

But don't stop with painting. PC Paintbrush also gives you an electronic type shop to work with. Several fonts, from Olde English to Computer. Each in seven styles (boldface, italics, underline, etc.) and seven sizes.

All of which makes it great for designing everything from fliers and report covers to greeting cards and birthday banners. (For a wall-sized work of art, just print sideways.)

The possibilities are endless. But the best way to see for yourself is to see for yourself. Get a demonstration at your nearest computer store.

Then, draw your own conclusions.



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633 Fifth Avenue • San Rafael, CA 94901 • 415/454-7101

RUNS ON: IBM PC/compatibles, and Corona PC, 192K RAM, IBM PCjr., and Mindset, 256K RAM, HP 150, 320K RAM. All require DOS 2.0 and up and 1 drive.

MICE: Summagraphics, Mouse Systems, Microsoft.

JOYSTICKS: Any IBM compatible.

GRAPHICS CARDS: Amdek, Hercules, IBM, PCjr., Quadram, Scion, Teomar, STB, Paradise.

MONITOR: Color or black and white.

OUTPUT: Printers: IBM/Epson graphics, Epson FX-80 and 100, MX 80 and 100, IDS Non-Color, IDS Prism Color, NEC 8023, C-Itoh 8510, Okidata 8X or 9X series, Radio Shack OGP-220, Xerox 1770, PrintsColor TC1040, Quadram Quadjet, Transtar Color, Diablo C150, Tektronix 4695, HP Thinkjet, Star Micronics, Epson JX-80, Data Products 8050, IBM Color printer. Plotters: HP 7475A and 7470A.

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People in the News: Phoenix Software

Neil Colvin, Rich Levandov, and Lance Hansche help set the standard for PC compatibility.

BY JOHN DICKINSON

BOSTON—If you have plans to build an IBM PC-, XT-, or AT-compatible computer, you'll probably visit Phoenix sooner or later—not the city in Arizona, but the software engineering firm in Norwood, Mass. You'll go there to see the latest items in the Phoenix Software Associates collection of IBM PC-compatible ROM BIOS software, the basic input/output software stored in a PC's ROM chips. And, if the firm's track record is any indication, you'll probably buy the latest edition.

"A Phoenix ROM BIOS customer will always get its product to market faster," according to marketing vice president, Rich Levandov, "because the BIOS is the toughest part of PC compatibility, and it's solved and licensable from us." That, continues Levandov, leaves the compatible manufacturer's engineers and programmers free to make sure the computer's system board and other components work and to pursue other objectives that make the product more competitive with IBM's.

Purchasing a Phoenix BIOS has other advantages as well. "The public needs to know just how compatible a PC-compatible computer is," according to Levandov, "and we're becoming the standard of PC compatibility." Phoenix guarantees the compatibility of its BIOS programs, and it even insures its customers against potential copyright suits from IBM (none of Phoenix's BIOS customers has ever been sued for copyright infringement).

A Veritable Who's Who

Phoenix's track record, and that of its customers, speaks for itself. The company's software engineering sales have grown by over 350 percent in the last 6 months, primarily from selling BIOS software to the likes of

AT&T, Tandy, Kaypro, and Wyse. Other products and consulting services have gone to companies such as Compaq, Texas Instruments, Wang, Victor Technologies, and Microsoft.

Many of Phoenix's BIOS customers cannot be mentioned

compatible. "The PC dynamic," summarized Hansche, "has set forth."

How can a small company (Phoenix employs about 45 people) keep up with the fast-paced roll of the IBM PC marketplace and technology? "Phoenix has a nice view of all areas of the in-

has been out there for a year, we have a large library of programs and a body of experience to draw on every time a major change, such as the AT, comes along."

Apple Not Tempting

From the start, Phoenix founder and president Neil Colvin has been the company's technical and spiritual leader. Like the rest of the principals in the company, he has an engineering background steeped in computer technology, and he shared some of his viewpoints on operating systems software.

"User-friendly means icons and all that mushy stuff," Colvin says, "and the future is not so much in visual techniques as in systems that are more knowledgeable about the user. Pictures take just as long to learn as words, and they take more time to use." He doesn't think icons are the solution to the man-machine interface problem in the corporate marketplace. "Computers should employ heuristic technologies that let the computer relate back to the user."

I asked Phoenix's three principals about other directions for the company, particularly Apple's Macintosh computer. "We've had requests for a Mac-compatible BIOS, but we're not sure it would be viable for Phoenix," answered Levandov.

Hansche added, "We understand the PC market and where it's going. Apple has not solidified a standard."

Colvin said that a Mac BIOS would be a big undertaking, and not necessarily a profitable one. "It would take 12 to 15 man-years, and I don't know how often we could sell it."

"We have, on the other hand," said Levandov, "had requests for a PC-compatible Mac product."



Neil Colvin



Rich Levandov



Lance Hansche

by name, at least not yet. "Announcements of new AT compatibles are being held up because Microsoft isn't ready to release MS-DOS 3.1, and Western Digital isn't ready with its new disk controllers," according to Phoenix's executive vice president, Lance Hansche. But even as he was being interviewed, David Kay called to give permission to release the information that his company's new Kaypro 286i includes the Phoenix AT BIOS software and a Phoenix-modified version of MS-DOS 2.11.

Life in the Fast Lane

New PC- and AT-compatible desktop computers are only part of the compatibility story at Phoenix. "The PC standard is rolling," says Levandov, "and it's getting into all sorts of new areas." He displayed an expansion card Phoenix designed to fit into a UNIX workstation to give it PC compatibility, and talked about turnkey self-service gas station and dairy farm computers that will soon be PC

compatible. "We stay close to Microsoft—we even alpha and beta test its new MS-DOS releases—and we're close to about 80 to 90 percent of the software vendors who use us as consultants and use Phoenix Computer Products software development tools."

Keeping up with most of the industry is one thing, but keeping up with IBM is another matter. "Mostly it means moving fast," according to Levandov, who adds that Phoenix puts small teams of crack engineers on any new IBM developments. "Paying attention to rumors does no good," he says. "Even if you listen to the best sources—people who have had their hands on the machine—the next PC may be any one of three totally different animals."

Staying on top of IBM isn't quite as tough as it used to be for Phoenix, but the company did have to play catch-up once. "We admit we were late to get started in this business," says Levandov, "but now that the original Phoenix BIOS product

PC Communiqués

EDITED BY JAMES LANGDELL

Does XCOMP Make V-Disks?

The Romans would be confused if they saw X plus X plus X add up to V.

XCOMP, a San Diego, Calif., manufacturer of removable-cartridge hard disks, ran this ad showing its PC expansion chassis, model 10-n-10, which contains a pair of 10 megabyte drives, or, as XCOMP puts it, "Two 10s."



You may notice a third "10" gazing back at you—a beautiful woman with one arm resting on the XCOMP chassis. What's more, she's the spitting image of Jane Badler, the actress who played Diana, leader of the reptilian invaders on NBC's recently canceled television series "V."

We asked XCOMP how it managed to get Badler to pose for a computer ad. Did the chief

lizard have a friend in the computer business, or perhaps she posed before her rise to small-screen stardom and planetary domination?

No, an XCOMP spokesperson explained, she wasn't really Badler. But, they noted that we were far from the first to ask this question—the model's resemblance to the lizard queen is quite striking.

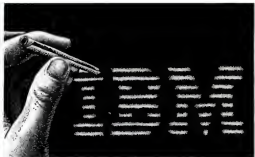
We here in the PC offices sincerely hope XCOMP is telling the truth. We'd hate to think that this ad was part of a plot to use XCOMP's add-on units to infiltrate an alien force into our true blue PCs!

Saved by a Computer Chorale

Mormonism, generally considered a conservative religion, attempts to harken back to a simpler, more personal era. But Personal Software Company in Salt Lake City (where else?) is trying to bring Mormonism into the computer age. Its \$29.95 *Introduction to Mormonism* program comes with a slide show, a beliefs guide, a doctrines guide, and an electronic hymnal.

Granted, the PC's puny sound system is no match for the mighty organ in Salt Lake City's Mormon Temple, but if you have access to a number of PCs, the program could help you create a new kind of singing group in your office—The Mormon Tabernacle Computer Choir.

—Fredric Paul



White Lines at Big Blue?

IBM seems to have more clout than the Los Angeles Dodgers when it comes to enforcing its team's clean-cut, drug-free image. Since late 1984, IBM has required urinalysis of all domestic job candidates to detect drug use.

A positive result on the two-stage urine chromatography lab test won't automatically disqualify a person from working for IBM, according to an IBM spokesperson. Candidates are considered on an individual ba-

sis, but IBM views any drug use as a negative element in the whole picture of the applicant.

Job applicants are told in advance about the urinalysis and its purpose. The test is performed as part of IBM's standard medical exam for potential employees. Applicants must also answer a questionnaire regarding drug use.

IBM doesn't use the chromatography test to detect marijuana use, as it considers the test unreliable for that purpose.

Computer Sheikh

This summer thousands will flock to Chicago for the National Computer Conference. Less we become too nationalistic, however, it wouldn't be a bad idea to note on your calendar that there is another National Computer Conference scheduled this year. Only this NCC, completely unrelated to the one held in Chicago, is scheduled for the kingdom of Saudi Arabia.

The Saudi NCC will be held in Al Khobar on October 1, 1985, or as the press announcement listed the date, 17 Muharram 1406H. No, Islamic years aren't numbered in hexadecimal—the H in the date stands for

hijrah, the emigration of Mohammed from Mecca to Medina that occurred in A.D. 622. (By the way—does anyone know of a program that converts the Islamic calendar to our Gregorian dating system? It's trickier than you might imagine.)

If you want to catch absolutely all of this year's NCC action, you can obtain further information about the Mideast version from its sponsor, ARAMCO, P.O. Box 1748, Dhahrao 31311, Saudi Arabia. (ARAMCO's phone numbers are (966) 3-875-5935 in Dhahran or (966) 2-653-4655 in Jeddah.)



Foolish Moves Confuse Computers

How can a chess master beat a chess-playing computer? One way is to make moves that would land you in hot water against a human opponent.

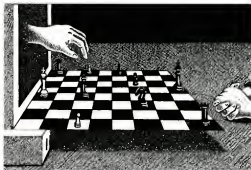
David Levy bet that he could beat any computer in a game of chess. The Londoner proved his point recently by beating the World Computer Chess champion, a program called *CRAY BLITZ*, in four straight games.

According to a report in the February 16, 1985, issue of *Sci-*

ence News, while Levy played out of London.

Levy explained, in *Abacus* magazine, that the strategy he uses against his software opponents is to create board arrangements that confuse the computer. Levy makes unorthodox moves unknown to the computer's programming, even though his positions sometimes have weaknesses a human opponent might be able to exploit.

"I think I can probably survive another 2 or 3 years before paying out the prize money," said Levy. ■



ence News, a trans-Atlantic tournament was arranged between Levy and *BLITZ*. The chess-playing program, created by Robert Hyatt of the University of Southern Mississippi in Hattiesburg, was run for the match on a Cray X-MP in Min-

Who Steals My PC, Steals Trash

Tandy keeps trying to clean up the "Trash-80" image that clings to its computers. Last year Tandy eliminated the TRS-80 and Radio Shack names on its freshest products. Now the company is trying to pin the "trash" label on other computer makers.

"Clean Up, America!" commands a recent Radio Shack newspaper ad. "Throw your orphaned computer or TV game on the junk pile," and Radio Shack will give you \$75 to \$150 credit toward buying one of its new, fully parented computers.

But what is an orphan computer? According to Radio

Get Smaller

In the electronic age, small is beautiful. When computers smaller than room-sized monsters appeared, they were dubbed *minicomputers*. When the desk-sized personal computer came along, jargonizers coined a further diminutive—*microcomputer*.

Now Wayne Green is threatening to devalue diminutive computer terms even further. He's launched a newsletter that is written for people who own computers that can fit inside a briefcase. Its subtitle is *The Briefcase Computer Report*, a dandy term for that genre of machine.

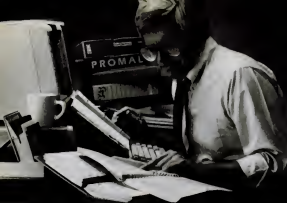
But Green had to go one jargon-laden step too far and is referring to these machines as *picocomputers*, and to his newsletter as *Pico*. A *pico* means one trillionth, and a 4-pound Tandy Model 100 would be a true *picocomputer* only if a typical micro, such as an IBM PC, weighed about 2000 tons. We really ought to wait for the advent of 1/2-milligram computers before we break out the picos. ■



Now The Mac's Can Do

Here at *PC Magazine*, it's none of our business, but we hear rumors of a new Macintosh program that enhances the file delete functions represented by the Mac's garbage can icon. This software package is called *The Ed Norton Utilities*. ■



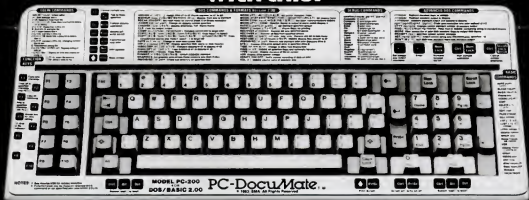


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Raleigh, North Carolina 27609

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And we can prove it.

We put our 1200 bps modem to the critical test. We stacked it up against Hayes, one of the "smart" modems. The results were conclusive: when line quality was good, our modem was one and one half times more accurate. When line quality was bad, our modem was up to ten times better. And when line quality was really bad, their error rate shot up to as much as 100 times ours!

Then we went inside and did a component count. The final score: Hayes 252, us 155. This can be viewed two ways: Either Hayes has a 60% better chance of developing part failure or our modem has a 60% better chance of delivering higher reliability.

The General DataComm intelligent modem is the newest product of a company that has been designing data communication systems for 15 years. Our customer list is a "Who's Who" of

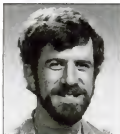
business. Now we're applying the technology that won the respect of Bell operating companies and other telephone companies in the U.S. and Canada, major banks, brokerage firms, and many of the Fortune "500" to the personal computer market. With a line of 300 and 1200 bps modems and communications software.

The General DataComm modem. We put it to the critical test. Now it's ready for the ultimate test. Yours. To find the dealer nearest you, contact the Personal Computer Products Dept., (203) 574-1118. General DataComm. Middlebury, CT 06762-1299.

 **general dataComm**

The best connections in the business.

Parity Check



BY STEPHEN MANES

As I pointed out in my last column, Americans just don't think that software is worth much. Information, entertainment, telephone calls, you name it: \$4.95 is where price resistance sets in. That odd phenomenon creates even odder implications for the future. With the help of *See-All* (Woolworth Software, two for \$3.99), my 576K crystal ball came up with these forecasts:

- *Computer software won't stay expensive far long.*

Prices are already dropping. Borland's relatively cheap stuff is setting industry standards, and the company may well be the first to have pulled off the trick of following one smashing success (*Turbo Pascal*) with a second (*Sidekick*). Now these folks have announced a do-more knock-off of *ProKey* for half the price.

This lowball strategy has helped Borland maintain customer goodwill despite buggy early releases; apparently people don't expect perfection from a cut-rate item. If I ran a one-product house like Lotus or MicroPro, I'd be sweating cantaloupes over the ability of a Borland to drop a reverse-engineered el cheapo bombshell—say, *3-2-1* or *StarWord*.

- *Hardware manufacturers could blow software makers out of the water.*

A computer packed with a huge array of free, easy-to-use software would be very attractive indeed. Given a disk containing a dozen first-rate productivity programs, a few high-level languages, a hundred games, and full documentation, most users would never need to buy any extras. The all-in-one concept is so seductive that a very rinky-dink version of it nearly made Coleco's Adam the people's computer.

But don't hold your breath. What stopped Coleco cold was that it couldn't deliver decent hardware *as* software. IBM may have earned a stellar reputation for its machines, but its off-the-shelf program offerings have been decidedly earthbound. And it still has visions of making big bucks in the add-on software biz.

- *Expensive substitutes for existing free services don't stand a chance.*

On-line services won't crack the consumer market unless they're virtually free to the user. Videotex has died in every test. The issue essentially boils down to this: Why pay real money to see the weather in low-res on your television set when you can have Willard Scott read it to you for free while you dress?

Business-oriented services that transmit volatile and time-critical data like stock quotes will prosper. Otherwise, forget it. Prognosticators always seem to ignore all the busy signals and computer timeouts that plague real on-line systems; such problems would only grow more irri-

tating if the field ever really took off. About the only thing in favor of on-line services is that users have no idea how much they'll shell out until they get the bill, at which point, aghast, many simply cancel.

- *Copy protection schemes are doomed to failure.*

The horse is out; it's too late to lock the barn door. The existence of a library of good, dependable, easily copyable software knocks user-hostile anti-theft schemes out cold. As long as unprotected old reliables are available, why bother with newcomers that insist you install some weird "hardware key," threaten to destroy your data, and keep you twiddling your thumbs until the company gets around to sending you a replacement disk?

Illicit copies have probably provided more useful demonstrations than all the nation's computer salespeople put together and have proven that there aren't that many programs worth copying anyhow.

- *The only home computer revolution may be the one that's already happened.*

By far the most popular computers in America are the single-purpose microprocessors in things like cars, microwave ovens, calculators, television sets, and VCRs. They're easy to use, and there's nothing else to buy: All the software comes built in.

For many people it's simpler to buy tiny homecomputers, calculators, and typewriters than one machine to do it all. Such sim-

ple dedicated machines may just win out over units that apparently require endless infusions of cash for expensive programs. Profit margins are already so brutally thin on low-end multipurpose machines that only a couple of companies remain in the fray, and those companies have demonstrated no talent for developing anything but expensive toys.

Building computers into televisions and/or phones could be the one workable alternative. For one thing, a "free" computer in a television would solve the kinds of hookup and wiring problems that long kept hi-fi components from reaching truly mammoth sales levels. Still, unless cheap software is available, home computers will simply languish, unused, in next-generation television cabinets instead of today's warehouses and closets.

- *Subsidized software might just be the wave of the future.*

The main reason for the low cost of most American software—newspapers, magazines, television, radio—is that it's subsidized by advertising. Would you use a free Dow Jones analysis package that popped a broker's spiel onto your screen every time you started it up? Would you be willing to have your bank waive its on-line service charge in exchange for making you watch a couple of dog food commercials?

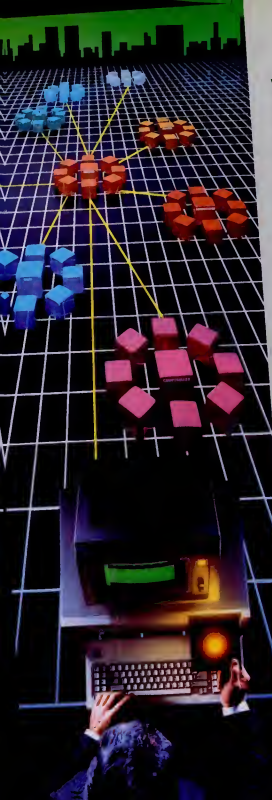
Well, yes. You just might. Someday you might turn on your Tramielovision and tell it, "Take a letter." In a dulcet voice, the machine would reply, "I'll be glad to. But, you know, dictation always seems to go better with a nice cup of Mountain Grown coffee . . ."

And then you would activate your special third-party "fast-forward" software, zap the commercial, and get down to your work. ■

Canned Experts

Attributing the output of an expert system to an autonomous mental life seems no more sensible than confusing a phonograph with a musician or even a composer.

—Fred Hapgood, "Experts to a Point,"
The Atlantic, February 1985



We've Put a Local Area Network on a Disk

Corporate Information Sharing. It's been described as the key to increasing a company's productivity. It's also why large networks of PC's are becoming more and more common in the workplace...in spite of the fact that they're costly, difficult to install, and incompatible with much existing software.

Finally, there's a solution to this corporate dilemma. Its name is LANLink™.

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A Network Designed the Way Business Works. With LANLink™ you're able to customize your network along departmental lines using a data-sharing hierarchy and password-protected access.

Get Started With LANLink™ TODAY. Call The Software Link TODAY for complete details and the authorized dealer nearest you. The LANLink™ Starter Kit, priced at \$495, comes complete with network software for both a server and a satellite computer. For a limited time, 50 feet of RS-232 cable will be included free of charge.

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BASF

From Pong to Petsters: Bushnell Keeps on Trying

The founder of Atari has a pet idea.

BY CHARLES BERMANT

NEW YORK—Forget what they say about "Star Trek." If Petsters catch on, the most prophetic TV show of the 1960s will have been "The Jetsons."

In the early 1970s, Nolan Bushnell invented Pong, the first commercially successful electronic game. From Pong, came Atari, which Bushnell founded and then sold to Warner Communications. A noncompetition clause kept him out of the computer fray for 7 years, but now he's back with a simulated roar.

He now heads Axlon, which manufactures droning bears, a simple robot, a set of trivia games, and Petsters, furry machines meant to simulate—and replace—house pets. They look about as much like real cats as Garfield does, but then the focus is admittedly "low-tech."

Bushnell envisions people going into pet stores to buy a dog or cat and walking out with a Petster instead. He says this with a straight face. Petsters, after all, can do anything that a cat can do—meow, purr, turn, walk, and sleep; courtesy of a chip-driven infrared transmitter.

"I'll bet you money," he says. "We will change the market for domestic animals."

Petsters were created, he says, because the relationship between man and pet is not cost effective. Batteries cost less than pet food, and a technician's hourly rate is significantly low-



Nolan Bushnell fooling around with one of his chip-fueled, furry friends.

er than that of a veterinarian. Last but not least, a Petster doesn't fill up a litterbox.

One of 256 different "personalities" have been programmed into each Petster. Like a real cat, you never know

if the one you take home will be nasty or nice. "If they were all the same," says Bushnell, "it would be boring. If we mass-produce pets then we lose our variability." He goes on to say, "we're not trying to knock off the cat, but a Petster is fundamentally better than a cat." Again, he is saying this with a straight face.

Users Wanna Have Fun

What about the future? Will people who have trouble getting dates be able to buy an artificial mate to help them through the night? "Sure-

1980, Pet Rocks. 1998, Pet Rockettes?

Bushnell says that IBM "missed some real opportunities" in the home market. He feels the PCjr is outclassed by the Apple's home machines. Nevertheless, an IBM-compatible version of Andy, Axlon's home robot, will be on the market this year. And he thinks that current computer users have it all wrong. "What are we here for? To paint contrails on the screen or to make money? The idea is to have fun.

"The personal computer is still a solution looking for a problem," he says. "It's too hard to use. I might have screwed things up, who knows?"

"But I would have gotten rid of keyboards, not that big a percentage of the population knows how to touch type. I would have worked with the mouse and the touchscreen and maybe speech recognition; the kinds of things Atari should have been doing 4 or 5 years ago."

Bushnell has definite ideas about computers and how they should be sold. The package, he says, is as important as what's inside. He doesn't act humble when he is called an expert about one aspect of the market or another.

What is his response, then, to the notion that some industry observers might see his involvement with trivia games, automatic pets, and droning bears as, well, lightweight? Suffice it to say, it is unprintable. ■

CALENDAR OF EVENTS

DATE	EVENT	COMMENT	LOCATION	CONTACT
April 23-25	Federal DP Expo	Computer, data communications, and office automation systems.	Washington Convention Center Washington, DC	The Interface Group 300 First Ave. Needham, MA 02194 (617) 449-6600
April 24-26	UNIX Systems Expo	Conference for users, resellers, and producers of UNIX-based products.	Moscone Center San Francisco, CA	Computer Faire, Inc. 181 Wells Ave. Newton, MA 02159 (617) 965-8350 (415) 364-4292 (CA office)
April 30-May 2	Sixth Annual Online Meeting	Meetings and exhibitions for users and providers of on-line database systems.	Sheraton Centre Hotel New York, NY	National Online Meeting Learned Information, Inc. 143 Old Marlton Pike Medford, NJ 08055 (609) 654-6266

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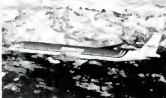
New customer service policy expected to set a new standard in the mail order industry!

BY MICHAEL CHRISTOPHER

GARDEN CITY, N.Y.—Mr. David W. Pasternack, President of Logisoft, a major IBM PC software and hardware distributor, has announced the inception of a unique new customer service policy. . . . free overnight courier delivery on their entire product line.

In a recent interview, Mr. Pasternack stated that "We feel our new free overnight delivery service will set a new standard in the computer software mail order industry. In a study we conducted, we found that in addition to competitive pricing, expedience was a factor utmost in our customer's minds. Whether their order was \$300 or \$3000, the need to get their package as soon as possible was the same. Under our old procedures, between processing and shipping time, it could take up to a week and a half to two weeks for an order to arrive. With our new courier service, an order can be processed, shipped, and arrive in our customer's hands in only 3 working days. . . . at no additional charge!"

The company is using Emery Worldwide to handle the large number of packages being shipped each evening for next day delivery. "We chose Emery for their competitive pricing structure and excellent delivery record", said Mr. Pasternack. Emery was quoted as saying, "This makes Logisoft the largest single Emery account in the New York Metro area.



LOGISOFT OF THE MONTH

Choosing software can be mind-boggling. With the proliferation of publishers, how do you choose. Analyze your needs. . . what specific tasks do you want to perform. Read the software reviews; an excellent way to evaluate a package. Ask around. . . you'd be surprised how many associates may be using a package similar to your application. Finally, choose the best package (not always the most expensive). Upgrading will end up costing you more. Remember the key word is research.

TOLL-FREE SUPPORT A Smashing Success

GARDEN CITY, N.Y.—A survey of Logisoft's toll-free technical support policy was done to see if it warranted the continued costs of the 800 toll-free number, personnel costs, etc. After careful monitoring of these calls (both pre-sale and after sale) it was found that 92% of the calls were for legitimate technical support questions rather than for answers already contained in the software's operations manual. As a result of the survey, the decision has been made to continue toll-free support as an important part of their customer service.

This service consists of assisting with:

- Hardware requirements
- Initial boot-up procedures
- Initial software configuration (printers, disc drive, etc.)
- Back-up procedures
- Defective program determination
- Alternative program recommendation
- Return policy

Logisoft's Lowest Price Guarantee Still Effective

GARDEN CITY, N.Y.—Logisoft, Inc. has indicated that their long time policy of guaranteeing the lowest prices in the mail order market is still being offered and will not be affected by their new free overnight delivery service. "We will continue to beat any price by \$10" a company spokesman said. "We'd be crazy to fool with success", he stated; "since the inception of our lowest price guarantee, sales have skyrocketed."

When asked how Logisoft could afford to give their customers free overnight delivery plus beat any price by \$10, they replied "Buying Power". "Very simply", they said, we buy at the best possible prices and pass those savings along to our customers".

CONTINUOUS STATIONERY: BIG BUSINESS, But "Where's The Class?"

NEW YORK—The growth of Logicforms, Inc., a member of the Logic Group, has been phenomenal. Mr. Ralph Corso, President of Logicforms explains why. "Up until now, buying continuous stationery through the mail has been a take what's available situation". "First off", he said, "almost all mail order firms offer only stock letterheads & envelopes with limited typestyles, colors and stock logos from which to choose, but, 'where's the class?'"

"The individual style and design of a letterhead", said Mr. Corso, "reflects the professionalism and personality of a company and should not have to change because they now have a printer and the need for continuous stationery. While other mail order firms are limited in the variety they can offer, Logicforms specializes in custom stationery. Logicforms offers a large selection of quality paper, ink colors and special effects such as thermography, blind embossing, foil stamping and multi-color printing." Mr. Corso went on to say that

"whether a customer chooses to supply his own artwork or printed letterhead, or wishes to select from our vast array of stock designs. . . . We are the Logical Choice".

For a free sample/pricing kit and a handy re-usable shipping envelope for artwork, simply call toll-free 1-800-645-3491 or send a sample of your current stationery for a free firm price quote. Mail to Logicforms, Inc., 300 Garden City Plaza, Garden City, N.Y. 11530

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Wordstar 2000	Lowest Price
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Wordperfect	\$295
Microsoft Word with Mouse	\$299
Multimate	\$269
Peachtree 5000	\$195
Volkeywriter Deluxe	\$199
Easywriter II: Speller Mailer	\$195
Edix & Wordix	\$255
Finalword	\$229
Samna Word III	\$319
XyWrite II Plus	\$299
Think Tank	\$139
Wordplus (Osiris)	\$115

DATA BASE MANAGEMENT

Knowledgeman	\$275
TIM IV	\$299
R Base 4000	\$295
dBASE III	\$369
dBASE II	\$299
Quickcode III	\$179
Condor III	\$325
Data Base Manager II (Alpha)	\$195
InfoStar Plus	\$295
Friday	\$199
prolink gpi II/III	\$199
Revolution	\$759
Powerbase	\$265
Personal Pearl	\$229

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THAT OUR CURRENT
VERSION GUARANTEE!**

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Aura	\$299
Open Access	\$385
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Framework	\$369
Symphony	\$429
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Multigplan	\$135
TK Solver	\$299

GRAPHICS

BPS Graphics	\$299
Fast Graphics	\$199
Chartmaster	\$279
Signmaster	\$195
pts graph	\$ 95
graphics: Graphics Pak	\$499
Energraphics	\$269
PC Draw	\$285
Chart (Microsoft)	\$179

FINANCIAL/SCHEDULERS

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Down Time



BY WINN L. ROSCH

When it's not handling business matters, the personal computer in the average American home often suffers from the same existential dilemma as its owners—lack of purpose in today's world. Although invaluable in the office, at home the PC is a refined thinking machine in a rough and tumble physical world, a brain expected to move boulders. To earn its keep, the PC at home has to do something physical in the real world—like the dishes.

Its greatest promise is in home control; taking charge of a whole residence and keeping it on an even keel: cutting utility bills, opening doors, vacuuming the cat. To date, however, the average home computer creates more garbage than it eliminates.

The homebound PC's primary problem is not too little power (as some writers believe), but that its 5-volt lifeblood is awed and overwhelmed by the 120-volt current coursing through your walls. To take control, your PC needs an interface.

As electronic projects go, building the interface circuitry required to give your PC electrical command of your household is relatively simple, but it requires some hardware engineering expertise, a source of parts (often hard to find), and time (impossible to find).

A promising alternative is to link your PC to your house with

the BSR X-10 control system.

The X-10 system is readily available (both Sears and Radio Shack carry it). It requires minimal electronic abilities—you need only set thumbwheel switches. And because it issues commands over your home's electrical lines using carrier-current signals, you not only save design time but also the effort of stringing wires through your domicile. The only problem in linking the X-10 to your PC is expense.

Assuming you already have a PC, even the marginal cost of adding an X-10 link to your system runs badly behind that of BSR's own bargain basement control modules. Dedicated X-10 controller cards for your PC cost \$200 or more, while BSR charges just \$20-\$70 for its standalone control devices. Moreover, each PC card robs your PC of an expansion slot. The toll is too heavy to make economic sense.

Orange You Glad?

Orange Micro of Anaheim, Calif., has hit upon a nifty solution: free (or nearly free) BSR interfacing. The company tosses in a link to the BSR system as one of the features of its mr. Chips multifunction card.

At the very least, the controller distinguishes the product from the other 10,000 almost-interchangeable multifunction cards on the market. However, mr. Chips' BSR X-10 feature fails to live up fully to its potential.

First a disclaimer: I find nothing wrong with mr. Chips as a multifunction product. It will neatly add up to 256K RAM, a battery-backed-up clock, a serial port, a parallel port, an unusual "real world" interface, and the BSR X-10 interface to your PC system. Furthermore, mr. Chips is nicely designed and well made. All the functions it shares with other similar multifunction products per-

form exactly as you would expect. On the other hand, the X-10 controller and "real world" interface should give the ardent hobbyist hours of delight and frustration.

Short Sighted

I felt shortchanged by mr. Chips not because of anything it is, but because of what it could have been. It has so much potential, which is why I felt slighted that its manufacturer didn't take the last step necessary to make the product truly useful.

The product's shortfall is software and, to a lesser extent, documentation. The only aid to using mr. Chips is a BASIC program that loads a short piece of machine language code. This allows you to switch appliances on and off, dim the lights, and so on. Unfortunately, it focuses all of your PC's energies and efforts on those tasks, turning your \$3,000 computer into a dedicated light dimmer for the duration of the program. Consequently, that "free" BSR X-10 interface doesn't come so free after all.

The control abilities could be genuinely useful if only the controlling program ran in the background invisibly, continuously stealing a tiny fraction of your PC's brain while you mash words or crunch numbers with other software. Like *Sidekick* or similar programs, you'd need only touch a couple keys to dim the lights in the bedroom or turn on the aircraft beacon at your hellport. Using it's system clock, your PC could even take automatic control.

Such home control software wouldn't be hard to write. If you have a reasonable knowledge of DOS's function call 27, you could probably do it yourself without much trouble.

Or maybe not. In mr. Chips' documentation, Orange Micro doesn't even tell you the port number assigned to the X-10

controller, and you won't see it by listing the supplied BASIC program. It's hidden somewhere in the machine language routine.

Master of the Universe

As an added means of putting the universe at your command, mr. Chips' "real world" interface allows a convenient way of sending and receiving raw digital information—on-or-off signals and pulses. In essence, the real world interface is a parallel printer port that works in both directions—sending and receiving information. (The IBM philosophy of parallel ports appears to be that it's better to give than receive.)

Even using the real world interface, you're still stuck with designing the circuitry to send data to it from the universe beyond or circuitry to turn its tiny digital output signals into electrical motivation capable of doing genuine work. And alas, mr. Chips' real world interface, too, suffers from the poor program problem that forces you to devote your PC to trivial pursuits.

If you want to play Mr. Wizard without mr. Chips, however, you've probably got a one-way real world interface already built into your PC—in the guise of an extra parallel port. If you can solder together a logic buffer and a solid state relay, you can make your extra parallel port switch the world on and off as easily as using BASIC to POKE the proper bit patterns to the port.

With eight data lines at your command, you might even be able to make a robot arm abide your bidding. ■

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Bruce M. Gast If you're not worried about the security of your PC, maybe you should be. PCs are a favorite target of thieves, so it's worth the trouble to protect yours. Using locks and cables are just two methods of securing your system.

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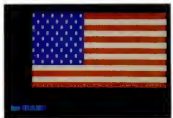
This issue of PC News continues John M. Worum's series on BASICs with a review of WATCOM BASIC V2.1.

John Dickinson reviews the latest revision of Microsoft's best-selling *Word*. Steve Rosenthal reports on a new operating system that will allow PCs and Apple Macintoshes to read each other's files.

Plus columns from our contributing editors: Down Time by Winn L. Rosch and Parity Check by Stephen Manes.

FROM THE EDITOR'S SCREEN

At PC, Data Is81
Barry Owen A love of words permeates the editorial process at *PC Magazine*. Our staff editors are editors to the hilt; we like word games; we have our favorite poets. And because we believe that language is a living and evolving thing, we are taking the lead in changing along with it.



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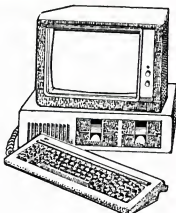
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At PC, Data Is

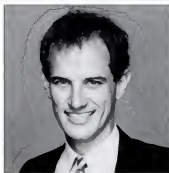
A love of words and language permeates the editorial process at PC Magazine. But, like it or not, language changes, and in this case our editors and writers will change with it.

Long ago, in the Late Middle Historical Period, First Digital Era—September 1983 by analog measure—PC Magazine printed a letter from Chip Clarke of Stony Brook, New York, excoriating us for treating the word *data* as a singular noun. "Data is the plural of datum," he ranted. "Data are! Datum is!" He concluded by pontificating that "it is a shame we don't pay more attention to our English."

The reason I bring this up is that we continue to receive letters about our treatment of the English language. A recent missive from Joe Eugene Lepo of the University of Mississippi also took issue with our handling of *data*. He recommended that we "investigate the use of the word *data* in *Science*, *Journal of Bacteriology*, or any of the many professional scientific publications that have been dealing with *data* and have been using the word correctly for about a hundred years before the existence of PC Magazine." Mr. Lepo concludes, "Alternatively, I suggest you look it up in a dictionary." Well, that's exactly what we did originally in response to Mr. Clarke. Our September 1983 reply: "Data are. You're right. Sort of. Your letter is a salvo in the unending conflict over the mutability of English. We know, of course that the word *data* is the plural of *datum*. . . . However, inasmuch as English lacks a central authority, we take refuge in the pronouncements of Webster, who, regarding the word *data*, rather cryptically notes, 'pl but sing or pl in const.' . . . Data is—Ed" Following Mr. Lepo's advice,

we discovered that Webster says, in effect, "Treat the word *data* either way."

Gentle reader, I want you to know that PC Magazine welcomes your interest in our treatment of English. Sometimes, it pains me to admit, we're wrong—embar-



Barry Owen

rassingly wrong. In fact, we spot errors in print all too often. The result is not pretty. Gnashing of teeth and convulsive howls are not unusual. Wretched, rhythmic keening sometimes ensues. But worse than anything is the mute paralysis, a momentary catatonia that afflicts a PC editor when he or she discovers grammatical, orthographical, or stylistic dereliction.

On-the-spot counseling usually proves effective. If I may say so, I pride myself on my soothing desk-side manner. A hand on the offender's shoulder, an admonition to take more care next time, a homily, usually something timeworn but effective. And then the reliable old balm,

reserved for the worst class of offenses only: "We'll print a correction."

Whether we're testing disk drives, evaluating 66 databases and 123 printers, or making contact with PC users in Namibia in search of exotic applications, we take great care with words, with language. That's why we suffer so when we lapse.

High Standards

Our former manager of copy editing, Anne Freed (who, pursuing more bucolic surroundings, recently moved to New England) brought the highest ideals and extraordinary abilities to the job of developing copy edit standards. Because of her indelible influence, William "The Elements of Style" Strunk is our god. Our bible is the *Chicago Manual of Style*. "What does *Chicago* say?" has become the most common question heard on Copy Edit Row.

Our staff editors are editors to the hilt. We like word games. We have favorite poets (chief editor Bill Machrone's is John Donne). We study the difference between restrictive and nonrestrictive clauses. We aim to avoid passive constructions, though not to eliminate them. "Use passive verbs consciously" we implore our writers. We read all manner of extraneous material because to an editor, nothing is extraneous; everything is information. We constantly debate gender, perhaps the most explosive editorial topic in English these days (I favor the carefully applied generic *he*). Significantly, we conduct all of our edits on paper except for "PC News." Naturally, we call

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CIRCLE 535 ON READER SERVICE CARD

these "hard copy edits." This practice is more expensive than on-screen edits, but it allows for greater control and accountability. We constantly correct each other's grammar but hasten to remind our-

selves that spoken English is a different language than written English. We read language columnists like William Safire and John Simon. We collect words and wear out dictionaries. Pervading every

activity, every cover package project, and the production of every page of type is a passionate love and respect for the language. And we still make mistakes that find their way into the magazine.

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The Ultimate Metaphor

Sometimes our mistakes are not really mistakes. As with the troublesome word *data*. While I encourage you to write when you discover a linguistic transgression, I think it's time for the Great Data Debate to end. So I asked assistant editor James Langdell to share his Analogy of the Salami.

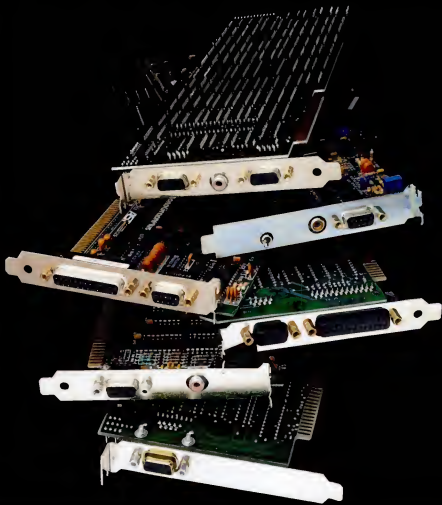
You speak of a stick of salami. You can cut off a chunk—that's a piece of salami. You can cut the chunk into slices—each slice is still a piece of salami. You can take a slice and cut it into strips to garnish an omelette—each strip is still a piece of salami. And at every stage of the process, no matter where you cut it, it's still called salami.

Note that during this slicing process, at no point did you produce a piece of salami so small that it couldn't be cut finer and still be salami. You discovered no absolute molecular unit of salami from which all salami is constructed.

When I write of a stream of data, I think of it much like salami. Data is a whole disk's contents. Or data is a file. Data is a record in the file or is a field in the record. Data is a word in the field, is a character in the word, is an attribute bit that's part of the character. Data even is the voltage level on one of the lines that sets the state of that bit within the computer. As you can see, there's no terminal point in this progression where the data has been reduced to a datum.

My point is that information hounds and applications aficionados that we may be, we care deeply about language. We're modernists, which doesn't mean "anything goes." It means only that we believe language lives, and like any living thing, it changes. At *PC Magazine*, consciously, but with no malice aforethought, data is.

STATE OF THE ART.



These are some of the most popular PC display adapter cards in the world. But few shoppers realize the many capabilities each board offers. Or how they interact with other system components. Or which might best suit their needs. In the same light, very few "discount houses" take the time and effort to test and evaluate these products. So they probably can't offer enough informative advice to assist you in choosing the best product value for your PC.

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In other words, when people buy a more expensive diskette, they aren't necessarily buying higher quality. The extra money might be going toward flashier advertising, snazzier packaging or simply higher profits.

But the extra money in a higher price isn't buying better quality.

All of the good manufacturers put out a good diskette. Period.

How to cut diskette prices ...without cutting quality.

Now this discovery posed a dilemma: how to cut the price of diskettes without lowering the quality.

There are about 85 companies claiming to be "diskette" manufacturers.

Trouble is, most of them aren't manufacturers. Rather, they are fabricators or marketers, taking other company's components, possibly doing one or more steps of the processing themselves and passing their labels on the finished product.

The new Eastman Kodak diskettes, for example, are one of these. So are IBM 5 1/4" diskettes. Same for QTSAN, Polaroid and many, many other familiar diskette brand names. Each of these diskettes is manufactured in whole or in part by another company!

So, we decided to act just like the big guys. That's how we would cut diskette prices...without lowering the quality.

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Instead, they concentrate their efforts on turning out the highest quality diskettes they can...because they sell them to the software publishers, computer manufacturers and other folks who (in turn) put their names on them...and sell them for much higher prices to you.

After all, when a software publisher or computer manufacturer or diskette marketer puts their name on a diskette, they want it to work time after time, everytime. (Especially software publishers who have the nasty habit of copy-protecting their originals!)

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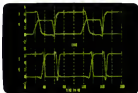
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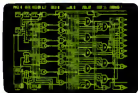


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"Typical MICROLOGIC Diagram"

Reviewers Love These Solutions

Regarding MICROCAP... "A highly recommended analog design program" (PC Tech Journal 3/84). "A valuable tool for circuit designers" (Personal Software Magazine 11/83).

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MICROCAP and MICROLOGIC are available for the Apple II (64k), IBM PC (128k), and HP-150 computers and priced at \$475 and \$450 respectively. Demo versions are available for \$75.

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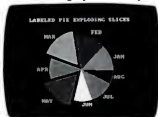
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Letters to PC

DOORS Modifications

I would be quite content if PC contained nothing but Programming, The Norton Chronicles, User-to-User, and PC Tutor. However, I do read each issue from cover to cover.

Within minutes of receiving the February 5, 1985, issue I began to enter the DOORS assembler routine described in the Programming column ("Try a Door, Not a Window," Volume 4 Number 3). When I assembled the program, I was greeted with six error 57 messages (illegal size for item). The errors were associated with the section of code that swapped the double-word vectors for the new keyboard interrupt routine. I think the program was trying to load a 4-byte address into a 2-byte register pair, which resulted in the illegal size error.

By including the assembler operator "WORD PTR" just before each vector label, I could assemble the program without error. I replaced the code in the "SWAP.VECTORS" procedure, located between the "CLI" and "STI" instructions, with the code shown below:

```
CLI                                ;DISABLE
INTERRUPTS
MOV AX,WORD PTR KB.INT.VECTOR
MOV WORD PTR ROM.KB.INT,AX
MOV AX,WORD PTR KB.INT.
VECTOR+2
MOV WORD PTR ROM.KB.INT+2,AX
MOV WORD PTR KB.INT.VECTOR,
OFFSET
DOORS.INT
MOV WORD PTR KB.INT.
VECTOR+2,CS
STI                                ;ENABLE
INTERRUPTS
```

With these modifications the program works as advertised and has proved to be very useful. I often keep a directory listing on one screen while I use the other screen for file housekeeping chores.

Michael Rose
Waltham, Massachusetts

John Dickinson replies:

From your letter I gather that you have Version 2.0 of IBM's Macro Assembler, which I didn't have when DOORS was originally written. Several bugs have been fixed in the new release, and the assembler allows less ambiguity in the source code as a result.

Version 2.0 is very picky about treating labels directly as pointers. When I tried the DOORS assembler routine in the new assembler, I got the same errors you did. The assembler also complained about the ROM.KB.INT variable's not being initialized.

There's no need to worry. Your correctly modified program generates the same machine code in either version of the assembler; the same code that's generated using the source printed here with the old assembler. I haven't tried it, but I think Microsoft's new assembler will behave the same way as IBM's will. Stay tuned—PC Magazine will have reviews of both.

BASIC CAPS

I would like to pose the following question in the Letters to PC column. Is there a statement that I can place in my AUTOEXEC.BAT file that will cause all letters that are typed to be capital letters?

Ray Battalora
Covington, Louisiana

There are many ways to force the Caps-Lock on. The easiest is to write a tiny BASIC program:

```
10 DEF SEG=0
20 POKE 1047,PEEK(1047)
OR 64
```

and call it CAPS.BAS. Then, in your AUTOEXEC.BAT file, include a line:

BASIC CAPS

Be sure both the CAPS.BAS program and BASIC are on your disk.

Apple Users Bite Back

I'm not sure if I should thank Paul Somerson for his thought-provoking editorial ("Manual Labor," Volume 4 Number 4) or lambaste him.

A year ago, I started a subscription to PC Magazine because I planned to replace my vintage Apple II computer with an IBM PC-XT. Somewhere along the line, I got sidetracked and ended up buying a "toy" instead. I don't think that the lack of copious documentation had anything to do with my decision, nor do I think that my experience installing Lotus's 1-2-3 on an XT necessarily had an impact (which manual was that driver installation sequence in, anyway?). I do think that the Macintosh documentation is great. Maybe the standardization that you think is a pipe dream exists in the Macintosh user interface. With all that front end in ROM, it's hard to develop a program that doesn't seem standard.

The machine does have its limitations, but I will not concede that they are indications of "skimpy computing ability." If the machine is such a toy, why are people trying to imitate it?

I agree with your observation that advertising can sometimes take cheap shots, but a cheap shot probably feels like a mosquito bite to Big Blue. In a world of "me too" clones, I give Apple credit for producing the Macintosh.

Gary Smith
Madison, Alabama

It's really too bad that I was riding a train when I read Paul Somerson's Editor's Screen (Volume 4 Number 4). Some of the best invectives I created for my reply were lost because I didn't have a pencil and paper or portable computer. My, what colorful writing Somerson uses: "... fouling the airwaves ... cheap shot commercial ... toy computers ... lumpy chowderheads ... deceit ... Cupertino con job ...". Somerson has no lack ofchutzpah. Ac-

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LETTERS TO PC

cusing Apple of a cheap shot after this string of cheap shots is outrageous.

Somerson's thesis is that the beginner with an IBM computer can ignore most of the documentation in getting useful work out of the PC and that it is unfair of Apple to imply otherwise. I just got two of my employer's IBM PC ATs going. From where I sit, Apple understated its case. Your analogy is preposterous. A foreigner can order a Mac without memorizing a dictionary, but the average neophyte will not get his or her PC producing useful work without that documentation.

Since *PC Magazine* would not exist without its subjects, it's natural for the staff to be cheerleaders for IBM. Somerson has tumbled over the line into outright partisanship. There is no doubt a good job waits for him in the public relations department in Boca Raton.

William Van Ark
Oceanside, New York

I read *PC* regularly and usually regard it as a class act, but I was disturbed by Paul Somerson's comments aimed at Apple computers and users. I am an experienced user of Apple IIs and the IBM PC, and I disagree with his remarks.

In "A Step into the Ring: The AT&T Personal Computer 6300" (Volume 3 Number 24), Somerson implies that Apple users are not serious computer users. I am sure that the myriad of people who run their labs, control large-scale mail-sorting operations, run their businesses, and perform other highly complex tasks with their Apples all think they are serious users. What are Somerson's criteria for determining who is a serious user? Is it based on knowledge of the machine and the ability to make it perform or simply on salary and software budget?

Somerson reviled Apple II's renumbering system in the User-to-User column in the same issue; however, "truly rotten" does not accurately reflect my experience with it. Admittedly it had at least one well-publicized (now patched) bug, but it has at least one highly desirable feature not found on the PC: I can renumber a section of code right smack in the middle of my BASIC program. I have yet to find a way to accomplish this on the PC using BASIC 1.1.

LETTERS TO PC

It serves no purpose to slur Apple. Needless downgrading of the competition appears to be defensiveness born out of uncertainty of the merits of the PC.

Dave Barnett
Decatur, Illinois

Paul Somerson replies:

This past year I had the misfortune to co-publish and co-edit several books on various Apple products, and was I glad to get my hands back on a PC when I was done. All I can say is: put a PC (or an AT) in a room with any kind of Apple and bring in a businessman or a professional (other than a professional doodler) and show him how to use both with the best software available, then let him decide which one he wants. I guess a few would pick Apples, but some people out there put Velveeta on Wonder Bread and call it a cheese sandwich. Apples are toys, with toy keyboards and toy operating systems. The real purpose they serve is keeping IBM out of antitrust court. What really annoys me is that Apple's advertising scares prospective buyers away from IBM PCs by making them seem over-complex and gets them to buy a vastly inferior machine that doesn't do the job. Sure it's easier to learn how to drive a boring American car with an automatic transmission, but it's a lot more fun and useful to get a five-speed import. If all you're going to do is drive it to the corner to get a carton of milk, either will do. If all you want a computer for is to say you've tried one, an Apple is just fine. For serious work, get serious.

Correct Rate

We would like to correct an error in the PC News review of IBM's *Sci-Calc* program ("The Solid Gold Calculator," Volume 4 Number 2, page 58).

There is nothing wrong with the sample routines included in the program. The only problem was that Badgett entered the wrong figures. He defined the rate period as one month, but then he used the interest rate per year (5 percent) instead of using the interest rate per period or month (.416 percent).

James C. Reilly
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I think I'll stick with my \$60 HP-12C programmable handheld for financial calculations.

Corrections:

The new number for Widget World is (805) 583-8600 ("Pulling Widgets Out of a Black Box," PC News, Volume 4 Number 6, page 52).

The Interactive Video Technology Newsletter, mentioned by Ariel Schwartz in his PC News story "New Disk Developments: Power Promises for PCs" (Volume 4 Number 4, page 33), is published by Heartland Communications, 223 Sunrise Dr., Shreve, OH 44776, (216) 567-3732. Another source of news in that field is Videodisk and Optical Disk Update, Meckler Publishers, 11 Ferry Lane West, Westport, CT 06880, (203) 226-6967.

The new price for BASIC Development System ("New Ways to Kill BASIC Bugs," Volume 4 Number 5) is \$125.

The correct phone number for VYNET Corp. is (408) 370-0555 ("The Voice of the '80s," Volume 4 Number 5).

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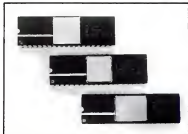
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The Good News About DOS 3.x

Although response to the new DOS hasn't been particularly overwhelming—except from AT owners—Norton still finds a few added goodies that can make a system change worthwhile.

Do you have DOS 3.0 (or 3.1)? Chances are you don't. Once you settle into using a version of DOS, there isn't much motivation to switch to a new one, unless you just *must* have the latest and greatest operating system, or unless a new version is necessary—like getting DOS 3.0 because you have an AT.

In this column, I'll discuss some little-known virtues of the new DOS series and talk a bit about the practical details of switching your operating system from one version of DOS to another.

As you've probably gathered by now—since it's been quite a few months since DOS 3.0 was introduced last September—for most people, there aren't many thrills to the new version of DOS. The most obvious enhancement is that it includes whatever special support the high-powered PC AT requires (mostly coping with the complexities of the dual-mode, high-capacity disk drive which makes DOS 3.0 essential to AT users). The other major change is the introduction of internal networking features such as file sharing and data locking (a technique that prevents the data from being shared by one program while it's being changed by another).

Something for Everyone

For network and AT users, DOS 3.x is important, but it doesn't seem so important to the rest of us. Yet there are some new and useful goodies for everybody in the latest DOS. Version 3.0 gives you the ability to make read-only files (which helps protect your data) and to control

disk labels (which helps keep track of disks). With Version 3.1, you can alias a subdirectory so that it appears to programs as a separate disk drive. The aliasing ability is very nice, but it also illustrates an ironic quality of many im-



Peter Norton

provements to DOS. When disk subdirectories were introduced along with DOS 2.0 and the PC-XT in the spring of 1983, there were lots and lots of programs that were firmly married to using the A: and B: drives, and we really needed to be able to alias them then to help adapt old programs to new disks. Now, 2 years later, when programs that can't adjust to subdirectories are rare, we finally get the tool we needed then and hardly need now.

A Change in FORMAT

For those of you who still aren't motivated to switch to DOS 3.0 or 3.1, I'll

discuss some more subtle benefits of the new series.

One of the best benefits of DOS 3.x is that it's much more wary about destroying data. The most obvious evidence of this is the changes in how the **FORMAT** command is set into motion. Say you've asked DOS to format a disk; DOS 3.x responds:

Insert new diskette for
drive A:
and strike ENTER when ready

In previous versions of DOS "Strike ENTER" used to be "Strike any key." This could make a big difference in data safety, especially if you want to abort formatting because you've specified the wrong drive. When it's "Strike any key," only the **Ctrl-Break** key combination will stop things. But when it's "Strike ENTER," you can accidentally hit any other key without setting the wheels in motion.

You may see little difference between the two instructions. But if you are as butterfingers as I am, or if you have turned your computer over to an easily flustered assistant, this change could mean the difference between a brief scare and permanent data loss.

Now let's consider the same scenario, but this time the data at risk isn't an A: drive floppy; it's the C: drive hard disk that holds every byte of data you possess. This time, DOS tells you:

WARNING, ALL DATA ON NON-
REMOVABLE DISK
DRIVE C: WILL BE LOST!
Proceed with Format (Y/N)?

Glory be! Even I might notice that warning. It's pretty explicit. What more could it do except ask for a note from my mother? Best of all, if I've gotten into the

habit of pressing Enter in response to a FORMAT message, I'm still OK. In this more-dangerous situation, the response requires both the letter Y and an Enter

keystroke. I'm not claiming it's totally foolproof, but it does reduce the risk of some nasty mistakes.

Easier Unerasing

DOS 3.x has a variety of changes that makes it less likely that you'll lose your data, and the best one of all is completely invisible. This change in DOS makes it easier to "unerase," or recover data from a file that was unintentionally erased.

Let me give you a little background information. When data is written to a disk, DOS finds room for it from a pool of available space on the disk. When a file is erased from a disk, the file's data isn't actually destroyed—it's simply "thrown away" by assigning its disk space to the pool of available space. If that space is later reused by another file, then the erased file will, of course, be overwritten.

But suppose that the erased and abandoned data hasn't been overwritten. With the appropriate clever moves, you can get your erased data back. This is what "unerasing" is all about, and you can do it though the magic of programs such as my *Norton Utilities* or IBM's Disk Repair Facility. The potential success of unerasing hinges on whether or not the erased data's space has been reused.

The DOS 3 Difference

Here's the part where DOS 3.x is different. In previous versions of DOS, when you wrote new data on the disk, the first available chunk of disk space was used. It was very likely that this first available space was occupied by the file most recently erased. If you had done anything with your disks between erasing a file and realizing that you needed to unerase it, your data was gone for good. If, thankfully, you realized your mistake immediately after erasing some data, you still had a very good chance of getting it back unharmed.

DOS 3.x to the rescue. I don't know if this was intentional or just the happy by-product of a change that was made to improve the performance of the AT's huge 20-MB hard disk, but either way, DOS 3.x now takes a different approach to

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NORTON CHRONICLES

finding space for newly entered data.

Other Goodies

Under the old rules, when DOS went looking for disk space, it would use the space most recently surrendered—the very disk space you mostly likely want back. But under the new rules, when DOS 3.x goes looking for space, it goes after the space that was discarded the longest time ago—the space you're least likely to want back. In other words, DOS now aids data recovery by preserving your erased data as long as it can.

DOS 3.x has a variety of changes that makes it less likely that you'll lose your data. And the best one of all is completely invisible.

There are many more concealed goodies to be found in DOS 3.x, but I've only got room to mention one more. You're probably aware of how the /S system option of the FORMAT command places two key DOS files (named IBMBIO and IBMDOS) on system-formatted disks; and also, how the SYS command will transfer these two system files to another disk, making it possible for you to update your disks from one version of DOS to another without having to reformat them.

However, you can't transfer the operating system (with the SYS command) to a disk that wasn't "system" formatted with the /S option. In other words, you can update a system disk, but you can't convert a nonsystem disk to a system disk.

That is, you couldn't with DOS 2.x. But now, a subtle and little-noticed change in the way that FORMAT and SYS operate makes it possible to transfer the system files (IBMBIO and IBMDOS) to an ordinary disk, if there is the proper kind of space for them. In effect, the FORMAT command now marks all disks as potential system disks. This potential isn't permanent: It can be overridden when conventional data is placed on the

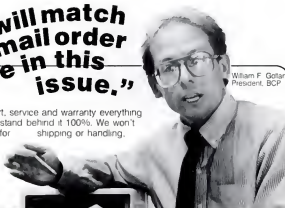
disk. But it does increase the flexibility of disk use.

That, in fact, is one of the main themes that we see running through all the im-

provements that are made to DOS, release after release. In gradual but significant ways, the flexibility and usefulness of DOS is being expanded. ■

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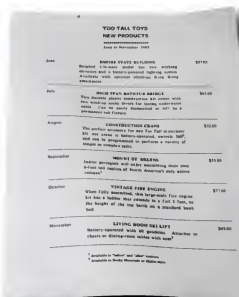
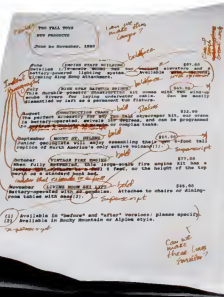
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TopView

TOPVIEW IS HERE—THE FIRST OF THE MULTITASKING, WINDOWING SYSTEMS FROM BIG-NAME MAKERS. *PC MAGAZINE* HAS TESTED ITS PERFORMANCE AND SPECULATED ON IBM'S MARKETING STRATEGY. OUR EXPERTS DISCUSSED IT AMONG THEMSELVES AND WITH TOPVIEW'S LIKELY COMPETITORS. THERE'S A GREAT DEAL TO ADMIRE IN THE PROGRAM, BUT PERHAPS EVEN MORE TO QUESTION. WE WONDER: IS BEING FIRST NECESSARILY BEST?

 TOPVIEW IS FOR NOVICES: IT GIVES THEM A MENU-BASED operating shell that shields them from the complexities of DOS. TopView is for software developers: It lets them do multiple things simultaneously, saving time and effort. TopView is for advanced users: It allows them to cut and paste among applications as well as run concurrent programs. TopView is for the birds: It's prevented from doing any of the above well enough to endear itself to users. Not that TopView isn't a significant program. It's a watershed product, even if no one buys it. Here's why.

Concurrency is an idea whose time has come to personal computers. So is windowing. Most minicomputers and mainframes can run multiple tasks from a single terminal, increasing productivity and utility. Personal computers haven't, until now, had the horsepower to do more than one thing at a time.

FROM THE BOTTOM UP

*"Well, I'd like to love you
... that is, I mean, I know I
should, but. . . ."*

Smart programmers have, however, managed to harness unused processor time to conduct a second activity in the background. A common example is a word processing package's ability to edit and print simultaneously. Likewise, print spooling programs allow printing while you use the machine for other tasks.

Desk managers such as *Sidekick*, *Spotlight*, and *PolyWindows* offer the illusion of concurrency by making themselves available while you are using other pro-

grams (see *PC*, Volume 4 Number 2, page 204). They window onto your screen, dial the phone, take a note, or whatever, and then disappear. Even though your main application appears to have been operating the whole time, it actually stops while the desk manager is operating.

Systems that offer true concurrency, such as TopView and Concurrent PC-DOS, actually do what desk managers only pretend to do—they keep multiple programs running at the same time. Time-

consuming tasks such as large spreadsheet recalculations and database sorts need no longer tie up your machine. You just call up TopView, switch processes, and start something new. At least that's how the theory goes.

Horsepower is still the big issue. As you'd expect, concurrency exacts a performance penalty. The degree to which it is obtrusive depends on how fast your machine is and the number and kind of applications you are running.

So why is TopView even worth a second look? One of the obstacles to concurrency and windowing has been the relative amount of freedom enjoyed by programmers in adapting their products to DOS. Of course, any programmer will argue that taking liberties with DOS is necessary to achieve the performance that users want on the PC. However, the increased performance of the new machines—the PC AT, Deskpro, AT&T, and Eagle Turbo—opens the door for disciplined programs that allow multitasking while overcoming much of the slowness associated with the original PC.

TopView defines a way in which programs can be written to function well in a multitasking environment. There is some top-quality programming in TopView, especially in the areas of window management and memory management. Even if it fails in the marketplace, TopView will have done a service to the industry by



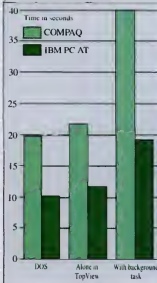
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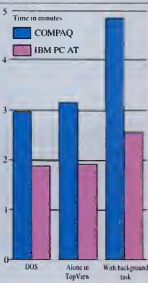
CIRCLE 667 ON READER SERVICE CARD

TopView's Performance

WordStar scroll 100K file



dBASE II index 700 records



Multitasking exacts a penalty on any processor. We tested programs that you might run concurrently—in DOS, alone under TopView, and together with a common background task. The background task behind WordStar was a dBASE II program that ran entirely in memory. The background task behind dBASE II was a BASIC program with a complex inner loop that took just over a second to execute on the Compaq Plus. There was no contention for disk access.

establishing and promulgating standards for all application programs.

Haute Computation

Here's my idea of what the well-dressed personal computer is wearing in the office this season: maximum RAM, a spreadsheet, a word processor, a database manager, and a desk manager. If the data files are large enough, it has a hard disk. Other programs and accessories are available as needed.

Chances are your own machine bears more than a passing resemblance to the above. If so, you've come to accept the delays as you switch from one application to another, or you've overcome the occasional need to get out of your spreadsheet and into the word processor with the notepad function in the desk manager. Okay, you have to exit to use the database or the communications program, but the time it takes doesn't really cramp your style.

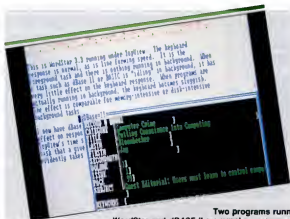
To accomplish the same thing under TopView, you must first have enough memory to accommodate all your applications, or at least the ones you want to execute simultaneously. You will also need a mouse; TopView is unsuited for use without one. You can install it for use with just the keyboard, but it's slow, ungainly, and annoying. Mouse buttons 1, 2, and 3 become the (numeric keypad) 7, 9, and Alt keys on your PC. The Ctrl key toggles you in and out of TopView keyboard mode. Using the keyboard is irritating compared with using a mouse, especially since it's accompanied by a cacophony of beeps, boops, and squawks.

Lights, Windows, Action!

To do anything with TopView, you have to build a menu of programs that it can run. It comes with an extensive list of IBM software and other products sold through IBM and its distribution channels stored in .PIF (Program Information) files. IBM also includes a book of popular non-IBM applications, word processors, and database managers, giving the settings that



TopView's Start-a-Program screen: Where it all begins. TopView presents all of the programs it knows about for your perusal. A square bullet to the left of the program name indicates there is sufficient memory to run the application. If there is not enough space, TopView will not allow you to select the item with the mouse.



Two programs running: WordStar and dBASE II are running concurrently. WordStar 3.3 cannot be windowed because it writes directly to the PC's screen memory. WordStar's presence in the background has little effect on dBASE II's performance since it is not receiving keystrokes. Its presence would be noticeable if it were printing.

MORE THAN A MANUAL

The TopView Programmer's Toolkit starts with the basic concepts to elucidate TopView's inner workings and provides some sparkling software of its own.

One of the keys to the eventual success of a concurrent task manager is a sufficiency of applications that run well with it. To that end, IBM has provided the TopView Programmer's Toolkit, a weighty tome that comes with two disks full of utilities and sample programs.

Describing how to interface application programs to a multitasking operating system extension can be tedious at best. IBM has gone to great lengths to make the Toolkit manual readable and informative. It starts with the basic concepts of TopView's operation, how programs interact with it, and how the machine's resources are shared. It fully defines all the terms that a programmer needs to know to speak TopView's language.

As a programmer, your linguistic skills had better encompass assembler if you are to make heads or tails of the documentation. Oh, there is an appendix on using Pascal with the Toolkit, but the implication is clear that real programmers don't use high-level languages. If you persevere, you are rewarded with deeper knowledge of how TopView works and gain an appreciation for its simply managed complexities.

TopView's functions are divided into classes (as in categories, not lessons). The classes that TopView knows about are the keyboard, mailboxes, object queues, panels, pointers, and windows. Whole chapters are devoted to each category, complete with assembler examples of how your program and TopView

interact. This is not for the faint of heart: No more than 38 pages into the manual, you are plowing through register-by-register descriptions of interrupt handlers.

But there's gold in them thar subroutines. For instance, you find that TopView manages both logical and physical windows for programs. The logical window measures 90 columns by 30 lines, while the physical window can be any subportion that fits on the screen. TopView is also fully capable of managing multiple windows for each task or application program. The applications can use queues in the form of data streams or messages to communicate with one another. An example is TopView's cut-and-paste capability. You also find that TopView provides such nifties as transparent and translucent fields within windows. These let the user "see through" the current window to the one below. You can use such capabilities for implementing cut/paste or copy features in your application or just for visual enhancement.

TopView is smart enough to know about data fields within windows and can interact with the user on a character-by-character, field, or full-screen basis. It can convert to uppercase, hand data off to validation routines, route error messages back to the user, and control the interpretation of the mouse buttons.

The window manager is wonderfully flexible and takes its cues from your application program in determining

whether it will allow the user to move, size, scroll, cut, paste, copy, or quit. It will also notify your program if the user has sized, moved, zoomed, scrolled, asked for help, requested copy or cut/paste, or tried to quit. All of the above are accomplished through straightforward calls, with a macro library provided on one of the Toolkit disks. This may not sound like much, but user interface routines are among the most difficult to write. The prospect of having it all there in a standard format is very attractive. Yes, it limits the programmer's personal expression of how a user interface should be designed, but then users have had about all the personal expression they can stand.

The jewel in the Toolkit's crown is the Window Design Aid, or WDA. This set of programs runs under TopView and allows you to design screens with an ease that's just short of intuitive. It has a mouse-driven full-screen editor that lets you position prompts, input fields, and output fields wherever you like, move them around singly or in chunks, and then assign field numbers and I/O attributes to the data areas. This last function is easier to use than the screen builders built into most of the database management systems currently available. The best part is that you can test every field on the screen for proper function without having written a line of supporting code. The data test mode allows you to enter data, then, in a separate window, shows

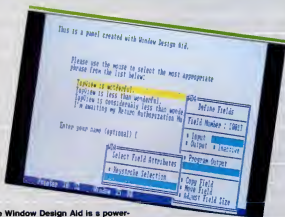
you what was entered and what its attributes were. It even works for point-and-click menus.

The WDA is flexible and powerful. It uses color to great advantage, right down to the soothing green of the context-sensitive help menus. A plethora of options lies just a mouse click away. You can even change your mind: WDA lets you reorder and renumber the fields. You can link the output from WDA to your programs. You can make the code memory resident for speed or disk resident for compactness.

One of the most intriguing things about perusing the ToolKit is the appreciation it gives you for TopView's performance potential. While there's no way to overcome slow machines or the 640K barrier, it's clear that most existing applications run under worst-case condi-

tions. Programs written for TopView are sufficiently well mannered to politely pause and allow other programs to run, and then automatically resume. Or they can request the machines undivided attention during a critical operation without having to resort to the *impolitesse* of disabling interrupts.

If the screen-handling functions that TopView provides had been built into DOS—if, through a miracle of foresight, Version 1.0 had come with the ToolKit—this would be a better world for PC users. Concurrency would be just a welcome enhancement to a repertoire of programs that all work pretty much the same way. But now it's a political football subject to acrimony, envy, and competition. A fine tool such as WDA may never gain wide acceptance because we're too set in our disparate ways.—B.M.



The Window Design Aid is a powerful full-screen editor for designing TopView-compatible windows, called panels. It has extensive options to control type and numbering of fields, editing, and method of input.

will allow the products to work best with TopView. Even if your favorite package is not among the ones mentioned, it shouldn't take you more than a few tries to get it running properly.

Installing a program for use by TopView is simple. You click Add A Program and then tell TopView the path in which the program resides, the name you want to appear in the selection menu, and the formal name of the program. If a .PIF file is present, TopView extracts the necessary information. Otherwise, TopView inquires about the relative politeness of the program—it wants to know whether the program writes directly to the screen, if it reads the keyboard buffer directly, whether it runs only in the foreground, and if it uses the math coprocessor.

Programs that write through DOS calls rather than directly to the screen can be windowed. You can start them at the default full-screen size and then use TopView's window functions to reduce the size and move the windows around on the screen. TopView also provides zoom and unzoom capability for switching between full screens and windows. You can specify a default window size other than 25 by 80 and a starting location other than the upper left corner of the screen.

You also tell TopView the minimum and maximum amounts of memory that the program will use. Once you click out of the Add menu, TopView adds the new program to the list under the Start A Program menu. A square bullet next to the program name means that enough memory is available for TopView to run the application.

To begin a program you simply point at its name on the Start A Program menu and click button 1. To begin another process, you press button 3 (or both buttons on a two-button mouse), which brings up TopView's main menu. You select Programs with the mouse and then click button 1, and TopView overlays the Start A Program menu onto your screen. You select the one you want to run and then click

go crazy trying to update off-screen things such as line counters in word processing programs.

In testing TopView, I dug out my old copy of *WordStar 3.24*, the predecessor to the current version. This version is widely known to be slow as molasses, primarily

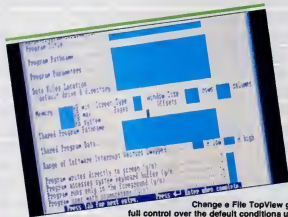
It's not really TopView's fault that multitasking slows things down.

because it addresses the screen through DOS calls. Speed considerations aside, this makes it ideal for use in TopView. You can patch *WordStar* for virtually any screen size, so it is feasible to have two versions of *WS.COM* on your system, one for full-screen operations, the other for a predetermined window size. You can call either one from TopView's Start A Program menu, and you can run both at the same time. Another program that writes "politely" to the screen is *dBASE II*. It also lets you configure it for screens smaller than 25 by 80.

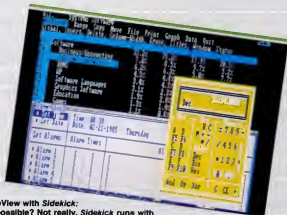
In use, both packages functioned normally, albeit a tick slower than normal. When *dBASE* was performing background sorts or indexes or running any kind of program, the effect on *WordStar* was immediately visible. Scrolling, help menus, and anything that updated the screen became ponderously slow. The PC AT, of course, was much more tolerant of all this activity than my other test machine, a Compaq Plus. You can see the rest of our performance results in the chart that accompanies this article.

Memory Maven

It's a good thing that TopView keeps track of the memory usage, because it sure makes it tough for you to see how much is free. For one thing, it forbids use of *CHKDSK*. To get around this, I installed



Change a File TopView gives full control over the default conditions under which a program operates. Setting minimum and maximum memory requirements allows TopView to squeeze a program into memory with less than you would normally use but with enough for a smaller job. It will allocate the maximum memory if it is available. If a program can be windowed, you can set a size smaller than 80x25 at locations other than the upper-left corner.



TopView with Sidekick:

Impossible? Not really. *Sidekick* runs with TopView but not concurrently. When you invoke *Sidekick*, all activities under TopView come to a halt. When you leave *Sidekick*, they resume again. Borland International promises that the next version of *Sidekick* will be fully compatible with TopView.

MOUSKETUTOR

When teamed up with a mouse, TopView's tutorial can offer the middle-of-the-road PC user a good taste of the program's capabilities.

Whether you are already very knowledgeable about DOS or are a relatively new PC user, you shouldn't miss the opportunity to experiment with the new level of operating-system sophistication that integrators such as TopView offer. If you choose to scale these new heights with TopView, you'll want to start on the ground floor by going through its tutorial. However, there are things to know about the tutorial that will make the learning process more like riding an escalator than climbing a steep flight of stairs.

First of all, *don't* use a keyboard. You should accept the fact that you will help to increase the electronic rodent population; go out and buy a mouse. Attempting to replace the mouse with a keyboard, even in the tutorial, will create a sense of disorderliness about the program's processes that is unfair to TopView and to you.

Page vi of the TopView user's guide states, "A mouse is recommended, but not required." This is merely IBM understatement. The three-button mouse, the ideal pointing tool to use with TopView, is given the following button assignments: pressing the button nearest the thumb (button 1) selects menu choices, the middle button (button 2) moves back one level on a menu, and the outside button, (button 3) always selects the main TopView menu. If you use a keyboard, the Home key is equivalent to mouse button 1, the PgUp key corre-

sponds to button 2, and the Alt key, on the other side of the keyboard, brings up the main menu.

For starters, this setup is confusing. It doesn't resemble the arrangement of the mouse buttons, nor does it follow the more common keyboard convention of using arrow keys for cursor movement.

Keyboard Disadvantages

Using a keyboard instead of a mouse engenders small, nagging inconveniences as well. You'll have to remember to press the Ctrl key to toggle the cursor between its normal use for moving through text and its TopView use for moving between menus. IBM should have either required a mouse or improved the use of the keyboard.

Once you're convinced to use a mouse and have it set up, you should read Chapter 2 in the user's guide. This brief chapter clearly explains how to start the disk tutorial from a floppy or hard disk and summarizes what you'll learn from it. (The information conveyed in the disk tutorial is also presented fully in Chapter 3 and is reviewed in short form in TopView's quick reference pamphlet.)

Starting the tutorial is not so simple as typing in "Tutorial"—Chapter 2 directs you to access it through the SETUP batch file. Once you start using TopView itself, you'll find that the tutorial is also available from the welcome screen.

But the tutorial doesn't tell you how to start TopView, either. Page 2-13 of the user's guide gives a hint, referring the reader to Appendix B for information on starting TopView with option codes. And sure enough, Appendix B says that you can start TopView from a subdirectory by typing G. By this time, most users will have discovered this by trying out all the .BAT files on the program disk.

If you want to use the Shift-PrtSc key combination to print any of the tutorial screens so that you'll print the extended graphics characters instead of extra numbers, you'll need a completely IBM-compatible printer; the DOS Graphics Command won't do it.

And one last thing before starting SETUP. Make sure the tutorial floppy is in the A: drive; if it isn't, you'll hang up the system and have to reboot.

Tutor Windows

The main portion of each tutorial screen is taken up by either explanatory information or a sample document in a window. On every screen, a window in the lower right-hand corner contains directions for the tutorial user. If you make a mistake, a guiding comment will appear here. The tutorial is rigged so that the options actually available to you are limited, and the menu options you are supposed to choose are highlighted.

The tutorial first explains how to use the mouse or keyboard, then steps you

through each function in the main TopView menu. Most of these main functions have several subfunctions that are represented on a secondary menu. For instance, the main function Scissors is an umbrella for three subfunctions, Cut, Copy, and Paste.

However, the nature of an integrating product such as TopView is that the subfunctions are rarely used alone but are almost always used with other functions or subfunctions. In order to move a section of text from one document to another, for example, you must use the Program function to access the first document, the Cut subfunction to pull out the text, the Switch function to go to the other document, and the Paste subfunction to move the portion of text to the new document.

Limited Scenarios

The tutorial creates a couple of scenarios in which you can try out these multistep procedures. These scenarios cover just a few examples rather than demonstrating every possible combination of functions and subfunctions. TopView has so many alternative routes and uses that a single tutorial can't include all of them. But this is also what makes TopView's tutorial unsatisfactory, both for the relatively new computer user and the advanced user.

An experienced PC user will already have a good idea of how an application functions and what it can do. Chances are he or she just wants to get the gist of a new package's commands and procedures and take it from there. For this kind of user, TopView's step-by-step tutorial is too plodding. Something along the lines of an interactive disk version of Chapter 3 of the user's guide would be more appropriate. The user could run through the functions in any order,

experimenting on a couple of sample documents, with short definitions and pointers appearing in a box on the side.

On the other hand, the relatively new or casual user may find that the tutorial doesn't explain enough about interfacing with the functions. This person could use a more detailed tutorial that would clarify

Using a keyboard instead of a mouse with the tutorial engenders small, nagging inconveniences.

how to combine the functions to perform increasingly elaborate tasks. Perhaps this could be accomplished by using more scenarios in the tutorial, or by using a series of related scenarios to make it clearer how the different functions relate to one another.

If you consider yourself to be a middle-of-the-road PC user—and if you use a mouse—TopView's tutorial should be just fine for you.

In the final analysis, though, learning to use TopView is like learning to use any software. To get started, run through the tutorial and read over the manual. After that, you'll probably need to review how to use the DOS Services menu, since you may finish the tutorial and realize that you still don't have any idea how to start one of your usual applications, such as *1-2-3* or *WordStar*. If you want to look over any portion of the tutorial itself, you can return to that point in the tutorial with the Topics function. But after that, you just have to start using TopView, experimenting with it, referring to the manual, and making it your own.—Stephanie Stallings

the Norton Utilities SI (System Information) program, which tells you how much RAM you have overall and how much is roped off as system memory. RAM allocated by TopView appears as reserved system memory to SI, so you can see how much is left.

If you start an application that gloms most of the remaining free RAM, TopView assaults you with a big red warning flag telling you that you're using nearly all the available memory. It also suggests that things may go awry and that you should start saving your files often—hardly comforting.

If you're really intent on running TopView-illegal programs such as CHKDSK and FORMAT, you can get away with installing COMMAND.COM to run under TopView. The screen clears, and you see the good old DOS prompt. You can then run any utility or program that you would normally run under DOS—if you've reserved enough memory. Incidentally, CHKDSK running under COMMAND.COM in this manner reports on the amount of memory reserved, not the amount left in the system. When you type EXIT, you are returned to TopView's Program Ended window. A tap on button 2 gets you back to the previous window or to Start A Program.

How About XyWrite and Friends?

You may have heard dire warnings about TopView's behavior with programs that write directly to your screen or otherwise attempt to take over your machine. Well, none of them are true. Even *XyWrite II* can be run successfully, although it's not particularly fond of having tasks run behind it in background—keyboard response is hurt. But the program does work. And it even does simultaneous printing and editing with tasks in background. This is only true if you are using a mouse. *XyWrite* otherwise grabs off the keyboard interrupt so that you can't get back to TopView without exiting. Programs that permit a DOS exit and return

work properly, but once in DOS you have only as much memory as was allocated to the calling programs, minus the amount it has already used.

Along these lines, I found that you can even run Borland International's *Sidekick* if you load it before you execute TopView. Invoking *Sidekick* halts background operations, but they resume when you exit *Sidekick*. After TopView runs, it doesn't always get all the interrupts back to their original values. Some programs, *Sidekick* among them, fail intermittently with a "Bad or Missing COMMAND.COM" error message if you don't reboot after exiting TopView. At this point, it's time for the Big Red Switch.

In an effort to protect you from yourself, TopView won't allow directory modification. *DEBUG*, *The Norton Utilities*,

In an effort to protect
you from yourself,
TopView won't allow
directory modification.

and some public-domain programs that sort or modify directory entries will not run. It only permits orderly I/O that it can control.

One of the selling points of concurrency is that you can theoretically do things faster in parallel than you can serially. I put this proposition to the test by sorting two *dBASE II* files at the same time. It takes longer to do two at once than one after the other. The interesting thing is that some background tasks run faster when the disk is being used heavily than when the majority of the action is in memory. I verified this by creating two BASIC programs, BEEP and BOOP (you can figure out what they do by their titles). Running various programs in the foreground caused them to sound off at different rates. TopView manages tasks by giving them equal time slices, but interrupt-driven tasks such

as disk access or printing can change the balance.

Summing Up

As a practical matter, TopView is unusable on a floppy disk PC. Nevertheless, the PC-XT cannot possibly be the machine that TopView was designed for. The difference in performance between an XT and an AT under TopView is like the difference between driving a Chevette and cruising with a Corvette. Even the AT's superior performance, however, doesn't overcome the 640K memory barrier. What's needed to overcome this limitation is a virtual memory version of TopView and about 2 megabytes of RAM. Then all your favorite applications could be resident without practical memory restrictions, and task switching would be instantaneous. Unfortunately, DOS would have to understand virtual memory as well, and you would need either RAM cards equipped with memory management hardware or an 80286 processor.

Another strong TopView feature worth mentioning is its use of color. You can change the default colors, but the ones it comes with are well chosen. Most of the screens are an unobtrusive blue and white. The TopView menus are yellow. TopView displays red only when something is wrong or requires your attention. This scheme matches IBM's new approach as seen in the Personal Decision Series and the Business Management Series of software products. This point may sound trivial, but it's in keeping with IBM's master plan.

TopView in the largest sense is clearly a part of IBM's master plan. It presages ever more powerful machines and operating systems. I find it particularly frustrating that there is so much to like here but so many obstacles to its use. You need a hard disk, a fast machine, a mouse, and better software, and TopView's user interface itself needs to be streamlined. Is TopView ready for the big time? Not until we get the big machines. ■

THE LIGHT PEN: MIGHTY AS A MOUSE?

Although IBM recommends using a mouse to sprint through TopView's menu and windowing operations, FTG's light pen may be the ideal TopView pointing device.

TopView is one of the first software products that works better with an input mechanism other than a keyboard. While users lacking such a device won't have much trouble making menu selections, they'll probably find it tough to scoot around the screen—and deft use of TopView requires much scooting.

IBM recommends installing a third-party pointing device and endorses optical and mechanical mice stamped out by Microsoft and Mouse Systems. (It also gives a grudging sanction to devices sold

by Kraft, Summagraphics, Maynard, and Torrington.) PC tested several types, and all worked fairly well. Three-button mice have an edge over those sporting only two, since users of the latter have to click both buttons simultaneously to simulate pressing button 3.

The real problem with mice is that they need a surface on which to roll. Users of optical mice can balance the metal mousepads on their laps or atop piles of clutter on their desks. Editor Bill Machrone perched his eminently usable Mouse Systems mouse on a pad between the rear of his AT keyboard and a handy IBM manual. Of course, it helped that his AT was nestled in a stand on the floor beside him, giving him the necessary desk space.

My desk is a different story. Somehow in the many office moves since PC burst its seams, I ended up with a huge, monolithic work surface faintly resembling a morgue slab. It's the only way I

can stack manuals and phones and monitors and system units atop one another in a dizzying pyramid and still have room to pour through the daily bags of press releases, letters to the editor, and crank mail.

I've been testing a two-button Microsoft "bus mouse" on my AT. It actually worked quite well once Microsoft sent us revision 3.0 of the software driver, which supports the PC AT, the IBM enhanced graphics adapter, and IBM's 3270 PC graphics mode. The mouse comes with its own interface board, which fills one expansion slot. Microsoft also sells a serial mouse, but the AT's peculiar serial port requires a gender changer and a hard-to-find 9-pin serial cable. (Incidentally, the Microsoft mice manuals are as good as I've seen in ages.)

But while mice may work on bare executive desks, they don't stand a chance on mine. My bus mouse is some-

where on my desk. I can tell, since its tail is protruding from a teetering midden of mail and manuals. I can extract it carefully from the pile, but it will just burrow into a new one in minutes. I've heard (probably apocryphal) tales of users who ran optical mice on their pants legs; the story goes that the white warp and blue weft of the jeans simulate the two-tone grid of a mouse pad. Somehow, sliding a plastic rodent up and down my thigh doesn't seem like the answer either.

While perusing the thorny *TopView Applications Guides*, I stumbled on a terse reference to using FTG Data Systems' light-pen as a pointing device. This seemed like the perfect solution. I could house a light-pen on the shoulders of my AT adjacent to the monitor or above the pencil ledge of the keyboard. I wouldn't have to yield any precious desk surface.

And light-pens are superb pointing devices. Using a mouse with precision is tough; it always reminds me of handling plutonium clumsily from the next room with long, remote-control metal arms. Light-pens are simple and direct. You want something moved halfway across and down the screen? Touch the glass at that precise location and it's there. If you have to hold the pen against the screen all day long your arms can get tired, but few users work that way. And repeatedly picking up a pen and putting it down can be a nuisance, but so is groping for a mouse on its square foot of clean turf and banging it into the surrounding piles of paper.

After test-driving FTG's light-pen, I'm sold. It isn't perfect, but it sure beats the tyranny of roping off a mousy lebensraum and then flailing away at your cursor in an awkward mouse-eye feedback loop.

A light-pen makes menu selection a breeze. And for moving and sizing win-



Using a mouse with precision is tough, but FTG's light pen makes menu selection, and sizing and moving windows a breeze.

dows, nothing comes close. But while FTG's light-pen works nearly flawlessly, it isn't the ideal solution to TopView's pointer problem. TopView was designed for a three-button mouse. The contact ring on the front of the light-pen works as button 1. But you have to bang the Ctrl key in conjunction with pen movements to simulate button 2 and the Alt key to summon the TopView menu (button 3). While this technique is easily mastered (at least for right-handed users), it would be far handier if there were three FTG-installed dots in a corner of the screen or on a pop-up menu to control button clicking.

To use a light-pen with TopView you need a slot-filling interface board. This is because the standard IBM light-pen circuitry treats the pen as a poll device, which means that a program reads it at the program's convenience. TopView is designed to run several programs at once and can't afford this luxury. It demands that pointer devices generate interrupts.

One of the two primary functions of FTG's Universal Light Pen Board is to generate such interrupts for TopView. (The other is to provide single-pixel resolution to make the light-pen useful for graphics programs. IBM's color graphics adapter treats all light-pens essentially as character devices for a 2-line-high, 16-dot-wide character, which limits their applicability for standard graphics programs. FTG added additional single-pixel counters to provide a full 640 by 200 resolution.) Software supplied with the board translates the interrupts into a form TopView will understand. TopView's SETUP program permanently loads FTG's software driver, using option 6 of the installation menu. The user calibrates the pen once each session by touching it against a dot on TopView's opening screen.

FTG claims that it has more than

6,000 pens in the field and notes that IBM is now selling the device. While Bill Machrone and I had few complaints with ours—the very first one off FTG's production line—it once (and only once) miscalibrated itself, which was fairly unnerving since the pen would chase the TopView pointer rather than pull it

FOOTAGE FILE

Microsoft Mouse
Model 037-099 parallel
("bus") mouse

Model 039-099 serial mouse
Microsoft Corp.
10700 Northrup Way
Box 97200
Bellevue, WA 98009
(206) 828-8080

List Price: \$195 for either mouse and software
Requires: (Model 039-099) Serial port.

CIRCLE 665 ON READER SERVICE CARD

Mouse Systems PC Mouse
Mouse Systems

2336H Walsh Avenue
Santa Clara, CA 95051
(408) 988-0211

List Price: \$195 for serial mouse and software
Requires: Serial Port.

CIRCLE 663 ON READER SERVICE CARD

FT-156 Light Pen and Universal
Light Pen Interface Board

FTG Data Systems
10801 Dale Street, Suite J-2
PO Box 615
Stanton, CA 90680
(714) 995-3900

List Price: Light pen and software
\$195; Universal Light Pen Interface
Board and software \$149
Requires: Color monitor.

CIRCLE 664 ON READER SERVICE CARD

around the screen. We fixed this easily by restarting TopView. At times the pen had trouble with black or dark backgrounds, but subsequent passes of the pen would resample the pointer. And when TopView toggled its pointer off or began acting flaky, we regained control by holding down the Ctrl and Alt keys.

One of the more interesting aspects of the light-pen was that we didn't have to touch the pen to the screen to move TopView's pointer. We could hold the device almost half-a-foot away and watch the pointer scamper from corner to corner. Having seen films about F-14 pilots who could aim and fire their dog-fight weaponry simply by looking at their targets, we wondered half-seriously whether it would be possible to mount a light-pen on a pair of eyeglasses or even on a headband so users could move the cursor just by staring at the menu.

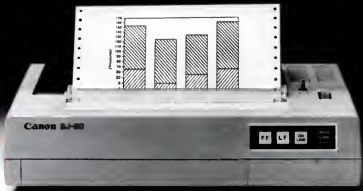
FTG president Douglas Lippincott reported that he knows of a head-mounted light-pen that uses telescopic optics. While it was designed for handicapped users and is available only for the Commodore 64, Lippincott offered to adapt such a device for PC users who contact him directly.

The price of the top-of-the-line FT-156 light-pen is \$195, plus \$149 for FTG's Universal Light Pen Board and software package, which will include the necessary TopView and single-pixel software. FTG will also offer a sophisticated MacPaint-like graphics program optimized for its new board.

Light-pens aren't for everyone, and some users may prefer the convenience of mouse buttons. But for clicking off menu selections and manipulating windows and blocks of text, they're hard to beat. For users with terminal clutter on their desks, they're the ideal solution to TopView's pointer needs.

—Paul Somerson

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CIRCLE 105 ON READER SERVICE CARD



TopView

IF TOPVIEW HAD COME THROUGH THE DOOR IN A BROWN paper wrapper, it would have been merely another clever utility for DOS, worth mentioning in this magazine, certainly, but not an event of epochal proportions.

However, like the small boy who has become king, TopView's importance resides more in the prestige of its station than in its inherent impressiveness. This, of course, is because TopView is being hailed as the heir apparent to IBM's microcomputer operating system empire.

Whether TopView performs faultlessly or foolishly as a software program (see the accompanying review) may have

little to do with its true meaning and importance. TopView is the subject of fevered whispers throughout the computer industry not because of what it does, but because of what it means.

A Trip Down Memory Lane

Understanding TopView's unique role in the scheme of IBM microcomputing requires a quick trip down mainframe memory lane. From its earliest days as a company, IBM was a stem, secretive dowager with big skirts. The company developed and built every part of every machine itself. Part of corporate policy was a visceral revulsion toward becoming dependent upon any ideas or technology outside its control. And the corporation was so proprietary toward its products that it often refused to sell them to customers:

They were obliged to lease.

When other companies attempted to compete against IBM in this closed world, IBM would sometimes counter by making small but crucial changes in operating systems or communications. While IBM serenely retooled its machines to handle the new wrinkles, competitors scrambled to find out what the wrinkles were. As a result, they were constantly chasing behind IBM, disappointing customers with their inability to provide the compatibility they had promised.

IBM's release of the PC was a corporate watershed because it changed all of these long-cherished traditions. Virtually all of the PC's components were developed outside of IBM. Most important, the operating system was licensed from Microsoft. And, to widespread amazement,

ENTERS THE FRAY

TopView's introduction may presage IBM's move toward a closed, proprietary operating system whose acceptance could hamper third-party development. But will users swallow the bait?

dowager IBM lifted her skirts all the way up to her knees, providing complete tech specs on the machine to anyone who wanted them. The world was invited under those imposing crinolines to join in the fun and do what they would in tandem with the suddenly frisky grand dame.

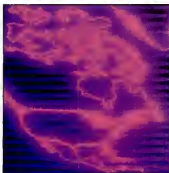
Third-Party Fever

For the past 4 years, IBM's complete openness about the PC has spurred a frenzy of third-party development that has impelled the machine far beyond all competitors in terms of software availability and popularity. And, to IBM's surprise, the PC has become a favorite among the big companies that have always formed the backbone of Big Blue's mainframe business.

Therein lies the rub. The last thing IBM wants is for the PC to wean its loyal customers away from their overwhelming dependence upon true Blue products. The freewheeling spirit of the PC, many IBM-watchers feel, may represent a kind of Trojan horse threat to the Armonk Armada's authority with its customers.

It is extremely important to IBM to link the PCs in big corporations to the larger IBM systems already in place there. That is why 3270-PCs, XT-370s, and *Displaywrite* software have been announced over the past few months.

But IBM has problems with the idea of linking DOS, a system it doesn't control, with entirely proprietary IBM arrangements. Partly, this stems from technical considerations. DOS is an operating system designed entirely for use by a single user at a solitary, unlinked computer. It doesn't buffer the user from the machine very much at all. In fact, a DOS user spends a good deal of time "talking" directly to the PC through the many DOS commands and routines. By comparison, a typical office system or mainframe environment separates the user and machine rather widely. The user works in an opaque operating environment or an interface—for all intents and purposes, the



TopView is the subject of fevered whispers throughout the computer industry not because of what it does, but because of what it means.

operating system is invisible.

Here is where TopView comes into the picture. At the simplest level, TopView is an attempt by IBM to create, on the PC, the kind of buffering, graphic user interface that is common on its larger systems. This approach has two big advantages for Big Blue: First, it will allow current IBM customers to feel more comfortable with the PC. Second, and more important, it lets IBM put a layer on top of DOS that is much more conducive to linking PCs with bigger computers. If IBM can convince the majority of software makers to write to TopView as a standard, rather than to unmodified DOS, it can make more PC applications available on office and corporate machines and vice versa. This makes all IBM computers worth more to their customers—an obvious advantage for the Westchester Wizards.

Speculation

This in itself is a major development, but there may be more to TopView than it expresses. Many experts think, and some fear, that TopView is the first step in IBM's lowering of the skirt over the PC—the beginning of a closed, proprietary operating system that will force third-party developers into the unenviable second-class status long suffered by Big Blue's mainframe competitors.

Is it? A look at TopView's code (see "TopView: The Hard Facts," in this issue) can give some clues, but no one can be certain of IBM's motives. The future of TopView depends largely upon how quickly and widely it is accepted by PC users.

TopView has competitors, including DESQ from Quarterdeck, Windows from Microsoft (attempting to retain control of its operating environment in today's user interface phase), and GEM from Digital Research (trying to get back into the ballgame after CP/M was spurned in favor of DOS when the PC came out). If these products give TopView a serious run for its market, IBM would probably not risk putting itself at a serious competitive disadvantage by closing the PC to outside development.

However, if TopView dominates clearly and quickly, IBM might be tempted to strengthen its control by taking TopView users even further away from native DOS, deeper into uncharted Big Blue territory.

Only the months ahead will reveal the truth of any of these speculations. But the fact that people are considering such notions has sent shivers through the PC universe and generated a level of watchfulness, possibly even paranoia, that may even surpass the pre-*jr* jitters of last year.

TopView may or may not be the most interesting software product around today, but it almost certainly is the most important story. It is the tale of the struggle for the hearts and minds of PC users—and that means you. ■

DIGITAL'S SHINING GEM

Tom Byers of Digital Research places GEM out of direct competition with TopView. GEM, he says, is designed to reach a wider market.

Whenever TopView is mentioned among computer professionals, Digital Research's new Graphics Environment Manager (GEM) is heard in the next breath. GEM is often held up as the great non-IBM hope in the user interface arena. But Tom Byers, GEM marketing manager at Digital Research, doesn't feel the two systems ever meet head-on. "We really don't see GEM and TopView in competition with each other, and I think that's a point we want to make sure to explain. If you take a quick-and-dirty overview, you might put them in the same category of software as application environments. Other than that, they really aren't in competition."

The Apple Macintosh, Byers explains, uses graphics, pull-down menus, and screen icons to establish its unique user interface environment. Essentially,

he feels, GEM brings a user environment from the family of Macintosh and earlier software products that ran on the Xerox STAR to the PC and other computers.

The roots of GEM lie back in the seventies when, at Xerox's Palo Alto Research Center, a machine called the STAR was created. Many of the concepts accepted today as making personal computers—or any computer—easier for humans to use were pioneered in this machine.

Those concepts first made their way into Apple computers—the Lisa and the Macintosh. And now they have started cropping up outside Apple's orchard. GEM is the first product to make Mac-like concepts available not only for IBM personal computers but for any MS-DOS machine, and many smaller computers, as well. So GEM is part of a long line of evolutionary human interface software.

The audience for STAR-based systems like GEM, Byers feels, is inexperienced, casual users of personal computers. And while it may seem as if TopView's creators are trying to make their products easy for casual users too, Byers believes that the crucial fact is that TopView is from IBM. This means, Byers says, that TopView's role is strategic for IBM. It will have wide exposure—press coverage, awareness in the marketplace, and retail shelf space.

IBM's marketing strategy, which centers on large corporate customers, leads Byers to believe that the product is aimed at experienced, frequent users. "TopView will make these users more productive by giving them more than one application on the screen at any given time," he says. "But those applications are what we call character based. TopView does not run graphics applications. So TopView has nothing to do with this bold new world of attracting and expanding the marketplace to people who have

been unreachable before. GEM does."

Byers uses Digital's own office staff, possibly not the most unbiased audience, to illustrate GEM's appeal. "In the office here we're nothing but a microcosm of the typical corporation. We have 600 people working, and they're not particularly well versed in the uses of personal computers. Everyone is using GEM—from clerks to programmers. It's very interesting. Many people would rather deal just with personal computers that have icons; so would I."

Essentially, GEM brings to the PC and other computers a user environment from the family of Macintosh and earlier software products that ran on the Xerox Star.

Beyond the graphic nature of the interface, Byers explains, GEM and TopView have other significant performance differences. TopView doesn't support graphics applications, including 1-2-3 graphics; GEM does. More importantly, GEM is not currently a mobile windowing system; TopView is. At this point GEM is extremely small, roughly 100K (about one-half the size of TopView), and it allows only one task to run or to be viewed at a time.

"The point," says Byers, "is that GEM is not a memory switcher. With TopView you are essentially talking about a memory switcher. You can have several things in memory at one time. What you can do with GEM is look at your disk drive files. The files are represented by icons, pictures that will jog your memory as to what they will do.

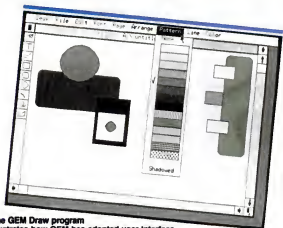
Once an application starts, then that application takes over the machine. And that's what GEM does, not only for existing applications like 1-2-3, but for applications that would be built specifically for GEM and that would take advantage of such GEM features as pull-down menus, windows, and icons. We're not in the situation of having several applications in memory and being able to jog back and forth."

As with TopView, Byers notes, GEM works best with software that is customized for it, and Digital Research is working with a number of software developers on GEM-oriented releases. But, unlike TopView, GEM proves readily

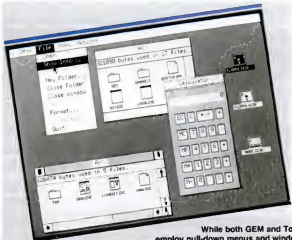
At this point, GEM is extremely small—roughly 100K, and it allows only one task to run at a time.

hospitable to most unmodified programs. "There's no need for IBM, on the other hand, to do this unless they want to reach new markets," Byers asserts.

The critical point for Byers is that GEM and TopView are not mutually exclusive. "TopView has a purpose in life: to window character-oriented applications. You need a hard disk and 512K memory to really get much use from it. That's fine for a certain marketplace. What GEM does, by contrast, is lay the foundation for a new wave of applications based on program menus, windows, icons, and other easy-to-understand graphic elements." TopView, Byers feels, reaches only computing's high end; GEM reaches "the entire world."—M.E.



The GEM Draw program illustrates how GEM has adopted user interface concepts developed by Apple for the Macintosh.



While both GEM and TopView employ pull-down menus and windows to present information, GEM uses icons as well as text to get its messages across.

A RIVAL TO WATCH

*Microsoft's Tandy Trower
says Windows opens the best
of two worlds—graphics and
multitasking—to PC users.*

Microsoft's Windows is willing, and almost ready, to compete with IBM's TopView, says Tandy Trower, Microsoft's director of retail marketing for systems software products. "I think the fact that it's out there at the present time and it's a product from IBM means that it carries a great deal of influence in the PC community. In one respect that's good for Windows, because it will help introduce and educate the community on concepts such as windowing and using the mouse to point at things, as well as the idea of multitasking.

"Obviously," Trower continued, "we'll have to educate folks on the differences between TopView and Windows and why someone would choose Windows over TopView. Both have pretty much the same capabilities; in fact, Windows can even read TopView's

PIF files (program information files). Both have the same capability to swap video RAMs of old applications, which is very crucial, because people have their favorite packages now. Until software vendors come out with products that use the enhancements of a particular environment, people certainly don't want to throw their old software away."

Microsoft's long-awaited integrator is slated for shipment this summer. But Trower sees its long development period as a distinct advantage. "In some sense, IBM developed TopView in an isolated situation. Windows has taken a little longer in getting out, but we've learned a lot from both our independent software vendors and our OEM customers in terms of things that we've been able to put in before we put out the product. I think that the feedback we've gotten has been significant in helping us produce a better product.

Best of Two Worlds

"What you are really seeing is Windows taking TopView and some of the features you see in the Macintosh and rolling them together so that you get the best of two worlds. You don't have the limitations of the Macintosh in being single-tasking, because Windows is multitasking like TopView. Also, you don't sacrifice the graphics as TopView does. You are allowed to do a lot of graphic interaction, using icons and pictorial representation like the Macintosh's."

Microsoft recognizes that some users will insist on using a keyboard, no matter how well the mouse interface is designed, and it is making plans to accommodate this group. Trower explains, "We have a keyboard interface that will be going into Windows. It essentially will be an interface that allows you to select for system-level functions, for instance, if you need to

move or size a window." But, he continues, "Windows was definitely designed for use with a mouse. And since we integrate a lot of the features that you see in other windowing environments, such as the Macintosh, using the mouse will be a much more natural way to work with it."

TopView Limitations

Trower uses the Macintosh as example of what people are looking for in an interface, and he measures both Windows and TopView against it. "I think a lot of people who own PCs look at the Macintosh and think that it's really neat and wish they had that sort of thing. TopView moves them in that direction, but it doesn't really have the features that you would find in the Macintosh, whereas Windows does. I think TopView is lacking in one very important aspect—graphics—and graphics are a very important part of an interface for communicating with people.

"TopView is also limited by the fact that it is an IBM product. That means that folks who are not using strict clones will not be able to run the TopView type of interface. TopView doesn't help in that situation. And TopView doesn't help if you want to do different fonts."

Trower sees the differences in Windows as advantages that will ultimately give it a competitive edge. "I think that what TopView will do is whet people's appetites for a Windows-type environment. If Windows were a character-based system, we'd have a devil of a time trying to compete with IBM, but the fact that we build on a foundation of graphics means that we have a significant advantage to show people. With its super set of features, Windows will look so significantly different that people will distinguish it as being better than TopView."—Stephanie Stallings

DESQ— SET FOR BATTLE

Quarterdeck's president welcomes the entry—at last—of competitor TopView. DESQ, she claims, will hold its own.

When Terry Myers, president of Quarterdeck, manufacturer of the software-integrating product DESQ, heard that TopView had been released, she said, "Thank God, it's finally here!"

Why would a small company be glad to see significant new competition from the King of the Hill? "Because," states Myers, "otherwise we're just waiting for something that's coming from IBM."

Myers believes that DESQ, which integrates many existing software packages, will hold its own with TopView, with one large caveat: "If people compare them." But, Myers continues, "the worse problem is waiting for something that's 'vaporware.' Everyone says, 'Gee, we'd like to standardize on you, but we won't make our final decision until we see TopView!'"

DESQ will hold its own against Top-

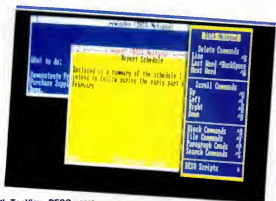
View, Myers believes, because it can do more for users. "When I compare DESQ with TopView, I use the analogy that DESQ is like a 1-2-3 and TopView is a VisiCalc. What 1-2-3 has is more power, more ability to use the PC's capabilities, and fuller features. Lotus's product has a customization and macro capability; so do we. Topview doesn't. Our data transfer is more extensive than TopView's capability; so is our ability to run programs. We use virtual memory, which means if there's not enough memory in your system, we'll swap the programs off the disk and manage it so you can open up more programs than would fit in memory. With TopView, you're limited to what is actually there."

For users, perhaps the biggest immediate difference between TopView and DESQ is that most existing programs will run under DESQ but will require major updates to use TopView fully. Myers feels TopView's requirements may be unrealistic, even for IBM. "Our

original assumption was, Who would rewrite their software for Quarterdeck? We believed that no one would devote resources to offering another unit or an update for their product to run in DESQ. So we don't require that. We spent a lot of time trying to ensure that we run software without modification."

For all her confidence, Myers admits that preparing to do battle with Big Blue can have its unsettling moments. "The worst time in our whole history, was when IBM first announced TopView. Everyone was saying, IBM is going to have 100 percent of the market—why would we want you? But soon people began to say, there's nothing like that in TopView; there are differences.

"Now things have settled down. We know we can compete." The native enthusiasm of the young entrepreneur takes over. "Isn't it wonderful to get these programs out there—to be able to compete against a competitor feature by feature in performance."—M.E.



As with TopView, DESQ users can point to menu options with a mouse; if they prefer, they can press one or two keys to activate a command.

A VIEW FROM THE TOP

Industry watcher Paul Spindel sees TopView claiming a large market among developers and users but not eliminating competitors from the fray.

Paul Spindel, vice president of consulting at the Gartner Group, Inc., in Stamford, Connecticut, is a highly respected industry watcher. As such, Spindel can offer an informed insight into IBM's strategy for designing and marketing TopView.

"TopView addresses a number of problems. It gives the user a common interface, a common way of addressing the machine. One of the problems we have is that everyone who develops software has his own way of letting the user use the software. Some use mice, some use menus, and some use code work. TopView gives the developer a consistent, uniform way of developing software. This ultimately gives the user a consistent way of accessing the programs he will be using."

This situation will also ensure wide-

spread use and consistent sales of TopView. As Spindel explains, "Because TopView is an IBM-sponsored product, most developers already have versions of it, and they are beginning to fit their application programs to the TopView system. You will find that nearly every major application developer will release its application to run under TopView. The user will develop an intuitive feel of how to go from application to application because IBM will be providing those tools through the TopView system."

"What's more important is that once the programs are written under TopView, IBM will be able to take the TopView system and move it from machine to machine. So they are giving the application programmers some portability."

With TopView, IBM is also giving users the capability they have been clamoring for—multitasking, the ability to run several applications simultaneously through windows. But Spindel points out that multitasking now has human, rather than technological, limitations. People can only focus on one or two or three things at the same time. There are also machine limitations—the size of the screen, primarily. It will be a while before we get bigger screens. Sometimes you want to compare one set of numbers with the text; it's nice to put them both on the screen and then merge them. But when you are running two or three things simultaneously, there just isn't room on the screen—or in your mind. So I think the computer people are pushing multitasking further than the user's ability."

Though he expects widespread usage of TopView by developers and end users, Spindel doesn't anticipate that this product will push its competitors out of the market. On the contrary, he says, "It will probably stimulate competition, rather than inhibit it, since the technological innovations—the new functions that

it offers—will be copied or emulated by other people. And TopView itself emulates functions that were developed first by independents. To the extent that it is IBM, people will try IBM's tools first, and so they'll try TopView first. But the major independents like Microsoft will each continue to come up with a best-seller, and the best-seller will sell on its own merits, whether or not it runs under TopView. Ultimately somebody will move that product under TopView."

The general consensus seems to be that users are eager for integrating products like TopView. But Spindel looks beyond that perception to what users ultimately will do. "Users aren't looking for

"Users aren't looking for TopView, they're looking for the application that runs on their machines."

TopView; they're looking for the application that runs on their machines. If a user is looking for a word processor, or some other application, and the application is comfortably designed and integrated with enough other functions to satisfy his needs, he'll go for an independent application. If a developer has used TopView as the skeleton on which to hang an application, then the user will take TopView."

Spindel points out an additional factor that may work in IBM's favor. "I'm sure this isn't a conscious decision on IBM's part, but if the tool works as well as we are told it will (I have a question mark in my mind here), then it's going to consume hardware resources in memory and processing time. That in turn will justify larger machines." —Stephanie Stullings



Press **T** to use the AppleLink Internet

Press **M** to continue

TopView



WE'VE RUN TOPVIEW ON OUR PC'S, DELVED INTO ITS INTERIOR, evaluated its performance, and tallied its costs. We've asked what its announcement means, and we've looked at its potential competitors. Obviously, the arrival of IBM's long-awaited official true-blue windowing environment and extension of the current operating system for the PC raises a host of questions—not the least of which are the technical ones. Here, in a question-and-answer format, is a look at how the program works.

What is the relationship between DOS and TopView?

Conceptually, TopView is a program that interposes itself between DOS and your applications programs. TopView attempts to provide a multitasking, windowed environment that enables you to run more than one program at a time and even move data between them. It accomplishes this primarily by acting as a scheduler for the individual programs and by manipulating the relatively slow input/output (keyboard, screen, and printer routines) with which you directly interact.

TopView intercepts some of the DOS and BIOS calls that applications programs make while they are running. Specifically, it replaces the interrupt vectors for the keyboard (9H, 16H, 1BH), the screen (10H), the printer (05H, 17H), the timer (1CH), and seven of the eight DOS vectors (20H to 24H, 26H, and 27H). Of the individual DOS calls that are accessed via Int 21H, TopView mainly concerns itself with those less than 0DH, that is, with the keyboard and screen calls. This is because

TopView needs to place each program's output in its own window and ensure that the program currently in the foreground gets the keyboard input.

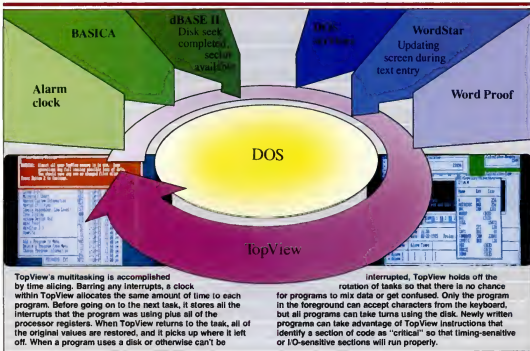
TopView explicitly forbids the use of function call 31H, as well as Int 27H, both of which cause a program to remain resident. TopView also does some additional processing of the new DOS 3.0 calls, 58H to 62H, before passing them onto DOS to handle. This indicates that it does some special handling of DOS 3.0's networking, file-locking calls.

Does this mean that TopView is an operating system in itself, an extension of DOS, or something else entirely?

TopView possesses some of the attributes of an operating system. For example, it provides scheduling for multiple tasks and does some I/O on its own. But it relies on DOS to do much of the usual work of an operating system, such as file I/O. Though it provides more functionality, in many ways it is similar to COMMAND.COM. TopView and COMMAND.COM both

THE HARD FACTS

*Prospective users need answers
to technical questions
about TopView.*



provide an interface between you and DOS. But TopView's windows are a fancier interface, and it is more flexible than COMMAND.COM in that it permits multitasking.

How does TopView manage the memory available to it?

TopView loads itself into low memory, just as other programs do. It manages the remaining memory by partitioning it among the several applications programs for which it has been set up. This technique was first used in some of the original timesharing mainframe computers. Before you can run an application under TopView, you must specify the program's minimum and maximum memory requirements through TopView's program instal-

lation or change procedures. TopView will only allow you to run programs whose minimum memory requirement will fit within the space currently available in your PC's RAM. If—perhaps because you have already loaded in several applications—a given program will no longer fit, there is no bullet for that program on TopView's program menu. On the other hand, as might happen in the case of spreadsheet or database applications, if your program does not require the full maximum memory you have indicated in the TopView installation process, you can still run it—up to the limit of the memory that you have left.

Since TopView seems like such a natural for the AT, with its faster processor,

has the program been optimized for—or is it in any way dependent on—the AT?

This was my initial impression. However, the AT didn't seem to run three times as fast as a PC while using TopView, though it was somewhat faster. A quick perusal of the code showed that TopView doesn't rely on any 80286-specific instructions. However, since large amounts of memory are essential for TopView (with less than 512K it's almost unusable), the AT's ability to utilize more than 640K will be a big asset when a protected-mode version of TopView is introduced.

What problems might TopView cause for applications not specifically written for it?



The memory diagram on the left represents a PC with 640K running a typical application such as Lotus's 1-2-3. Even with a utility such as Sidekick active, an enormous amount of memory is available for the worksheet. The second diagram shows how the same machine might look with TopView. When you install a program in TopView, you specify the minimum and maximum memory that it can use. If you want

to run other applications concurrently, you must have sufficient room for them. Therefore, 1-2-3 is installed with a memory ceiling. A background operation, dBASE II, is loaded in the third example. The amount of memory allocated to 1-2-3 has been reduced to make room for dBASE II. Many programs are like dBASE II in that they will not run any faster or better with additional memory.

The first problem is for applications that usurp the keyboard interrupts. If a program does this, TopView can't know, for example, when to toggle between windows or when to give you a menu. Some, but not all, of these limitations can be overcome with a mouse. If your system is not equipped with a mouse, programs such as *XyWrite II-Plus* can be used only in the foreground and can be left only by exiting completely. Certainly this limits the usefulness of TopView with this kind of application. Furthermore, TopView explicitly prohibits programs that need to remain resident. *Sidekick*, for example, probably cannot be used fully with TopView, though by loading it before invoking TopView I managed to use some of its functions, despite IBM's prohibition.

Will these problems force users of TopView to use only programs written for it? If so, will this push people to be more dependent on IBM for software?

Programs that are well supported by TopView make it that much more useful, because they facilitate full use of its cut-and-paste operations, for example. This does not mean, however, that applications not explicitly written for TopView are unusable. With the exceptions stated above, most programs can run with TopView and derive some benefit from doing so. In general, when data is transported from one program to another, it is sent in the form of straight ASCII codes, which TopView loads through the keyboard buffer. Most database and spreadsheet files can be handled in this manner.

In light of all that has been said so far, under what circumstances would TopView be useful, and when would it be not useful or, worse, detrimental?

Obviously, if your use of the PC consists principally of using "take-over-the-machine" programs such as *XyWrite*, with occasional forays into *Sidekick*, this is not the product for you. Likewise, if you don't need to run multiple applications simultaneously (beyond print spooling) or move data from one application to another (cutting and pasting), TopView will be of limited value. If these capabilities are useful to you and if TopView can help you perform them with the applications in which you have already invested both your time and money, then TopView can be a real boon.



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TopView

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Listen, I'm about the biggest cheerleader IBM has. Unless the company deliberately shoots itself in the foot (as it did with its limping PCjr), IBM is without a doubt the premier microcomputer hardware crafter in the galaxy. Nothing even comes close.

While for short periods of time they may buy a few lemon components from hapless suppliers, those guys in starched white shirts down in Boca Raton sure do know all their ergonometics, micro-electronics, styling, and cabinetry.

Software is another matter. IBM's PC-DOS isn't bad, but it could sure use more powerful batch abilities and slicker file handling. IBM has released or endorsed more than half a dozen undistinguished word processors for the PC; presumably they'll keep going until they get it right. Some of its more popular programs are just relabeled products from pfs that are very easy to learn and use, but not exactly what you'd call world-class stuff. And IBM's recent blitz of Business Management/Personal Decision Software is just old (nonvintage) wine in new bottles that

leapt onto dealers' shelves and stayed there.

IBM's touts and flacks have heralded TopView as the operating system of the future. Their theory is that computer vendors have already creamed the market of intelligent, dedicated users who are willing to put up with the abstruse and unforgivingly precise command language of today's systems. The next—and far larger—audience is presumably the great mass of yokels who have trouble coping even with the controls on their television sets. This is clearly the target of the Appretariat Macintosh, a sort of glitzy automatic bank teller machine with great graphics.

Removing users from the thick of the action isn't entirely bad; all operating systems do it to a degree. Instead of forcing us

A DOS (DIS) SERVICE

Although it's heralded as the operating system of the future, the system's long and arduous menu sequence and DOS-crippling features are just two of the reasons why IBM's TopView just doesn't cut the mustard.

to specify sector locations and head-setting times and memory addresses when loading or copying files, DOS takes care of the drudgework by accepting terse mnemonic English commands. But there's a big difference between the guts-level guidance of DOS and the silly Romper Room ministrations of the Mac.

When I'm deleting an unwanted file I tell DOS to delete or erase it by entering `ERASE FILE.OLD`. Ask a Mac user how he or she does this? "Oh, easy, first you drag it down to the trashcan with the mouse and then you empty it." Give me a break.

While TopView hasn't gotten this silly, it is moving in the Mac's numbing direction. PC users are spared the learning-disability icons; IBM respects its users enough to assume they can figure out that the `ERASE` command erases files. And TopView sagely asks users to verify the process (which will cut into the sale of the

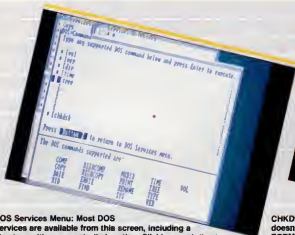
Norton Utilities' popular Unerase software). But to erase a file, a TopView victim has to slog through a series of menus, ticking off the proper choice each time. One slip and the user ends up in a Never-Land somewhere far away, with the glum prospect of a long and arduous menu-hopping trip back.

Border Wars

I'm now struggling to write this in *WordStar*, albeit a black-bordered, slowed-down, fickle TopView implementation of *WordStar*. First, TopView stole my border color. I can run all sorts of programs to get the color momentarily back, but then TopView just up and steals it again. Second, I have to toggle the Ctrl key off or my AT will just grunt annoyingly at me if I touch a cursor arrow, or will ping insanely like a frenetic video game if I rest my pinkie on the Ctrl key itself. Third, the screen action is a bit stiff,

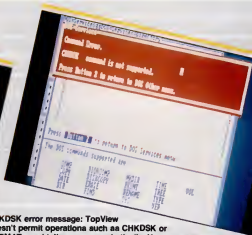
as TopView does not give its full attention to any program even when it's not executing anything else. But worst of all, the whole house of cards crashes down if I try to exit while anything is askew; if the Ctrl key is toggled wrong, or the TopView cursor—which IBM calls the pointer—is on the wrong side of a window border, all I get is the deep freeze; I can't even quit TopView. Okay, so users have to learn the drill with any new program, but this is unduly complex and clunky.

The one feature that most users scream for is the ability to execute DOS commands from within an application. How often would you like to see how many bytes are unoccupied on a floppy, or how much memory is free? Or be able to format a new disk so you could dump the contents of memory onto something permanent? Unfortunately, TopView can't handle three-quarters of the available DOS commands and is picky about the ones it



DOS Services Menu: Most DOS

Services are available from this screen, including a directory with user-controlled sorting. Clicking a subdirectory entry changes the display to that subdirectory, but there is no quick route back to the parent directory. Your DOS-trained fingers will find this menu inconvenient for copying and renaming files and handy for selective erasing.



CHKDSK error message: TopView

doesn't permit operations such as `CHKDSK` or `FORMAT`—and tells you so emphatically. You can set up `COMMAND.COM` under the Start A Program menu to overcome some of TopView's limitations. It is more convenient for renaming and looking at other directories. `COMMAND.COM` can also run in a small, unobtrusive window.

allows. Such mainstays as CHKDSK, CLS, MORE, SORT, FORMAT, RMDIR, PATH, PROMPT, SET, and ASSIGN are verboten. IBM apparently thinks you should be able to copy system files to an already formatted disk via the SYS command TopView supports—but it won't let you FORMAT the disk in the first place. Similarly, in its peculiar logic TopView will let you create a new directory, but not remove it.

Users can execute any of the 17 available DOS commands through TopView's DOS Services program, which comes already loaded into the main Start A Program menu. The selection of allowable commands, such as VER or VOL, seems frivolous. After all, how many times a day do you really need to display the volume label on your disks? But to format a floppy, or simply to see how much space there is on a disk or in memory, you have to exit TopView, perform the DOS command,

then reload the whole works. Some of this may stem from TopView's inability to support operating-system functions in any DOS version higher than 2.1.

TopView can't handle three-quarters of the available DOS commands and is picky about the ones it allows. Such mainstays as SET, CLS, SORT, PROMPT, MORE, and ASSIGN are all verboten.

If you happen to have a mouse attached to your system, you can scoot around the screen with dispatch and rapidly click off commands using the mouse's buttons.

However, mouseless users will end up relying on cursor keys to move the pointer and the odd combination of Home, PgUp, and Alt keys to select menu options. Alt (the equivalent of mouse button 3) brings up the main TopView action menu; hitting it twice in succession cycles you through all the programs currently loaded. Home (mouse button 1) makes menu choices, while PgUp (mouse button 2) cancels them. The Ctrl key toggles you in and out of TopView mode, which lets you use all these "TopView Action Keys" for their normal functions when necessary. (Still, the three keys many TopView tyros may find themselves using when hopelessly hung up are Ctrl, Alt, and Del.)

The real advantage of a mouse is in moving large distances across the screen. Without a mouse you're normally forced to creep around one column or row at a time by machine-gunning the cursor arrow keys. However, by holding down the Ctrl key while tapping the cursor arrows, you can move in bigger steps. And you can increase the size of the steps by repeatedly tapping the + key. Unfortunately, if you like to set the step size larger than the default, which can really rocket you around the screen, you'll have to reset it each time you start TopView.

Red Light District

I can erase a file on my logged subdirectory with WordStar's "KJ" command, but if I want to eradicate something somewhere else without using TopView I would have to save what I'm doing, exit WordStar, and spin through a few directory searches and relatively elaborate DOS syntaxes to get the job done, then reload WordStar and reopen the file I was editing. This sounds complicated, but I'm so accustomed to it I can do it in my sleep.

To handle the same job in TopView, I have to first hit the Alt key and then move the pointer down to the Switch option (or cycle through to DOS Services with double Alts). If I've already loaded DOS Ser-



Other DOS Services menu: DOS features not selectable by pointing and clicking can be entered on the Other DOS Services menu. TopView rejects the ones it doesn't like, executes the utility, and returns to this menu. This menu saves the DOS utilities that you enter and allows you to select them from the menu by clicking the bullet. You can enter parameters for the commands that require them by positioning the mouse pointer after the command name and clicking button 1. Throughout TopView, this action moves the active cursor to the pointer location.

vices I can move the pointer to it and bang the Home key to select it. If I haven't loaded DOS Services, I either have to switch to Start A Program, or move the pointer down one notch to Programs and hit Home. Once I breeze into DOS Services, I have to wait until TopView loads and displays the default directory, which is not always the one I want to be in. If I want to change logged directories, I have to type in the new name at the top of the directory window.

One of the most irritating things about DOS Services is that the little red light on your disk drive pops on with alarming regularity; TopView always seems to be reading the directory. It automatically alphabetizes the list of files, or you can tell it to sort by extension, size, or date/time. This is handy, but slow; you'd think TopView wouldn't have to access the disk each time you told it to sort on another field.

No, on second thought, perhaps the most galling thing about TopView is its inability to run DOS batch files. Some users may grouse about TopView's failure to cut-and-paste bit-mapped graphics images, but I feel IBM is right in assuming this deficiency will affect a tiny minority; most users will simply snag paragraphs or 1-2-3 bottom lines and incorporate them into memos and reports. But every power user I've met relies on batch files to get everything done; without them tasks have to be handled manually and laboriously. And other powerful features such as redirection of I/O won't work either. Do you get the feeling that TopView is for wide-eyed novices?

Nasty Problems

Actually, the supremely infuriating aspect of TopView is that it won't scroll automatically. The DOS Services directory holds only 19 entries at a time. If you move the pointer down to the 19th listing and lean on the down-arrow key, the pointer hugs the lower border and all you get is a droning guttural rattle. To see what other files are on your directory, you have

to move the pointer inside the appropriate window, call up the main menu with the Alt key again, move its pointer up to Scroll, and punch Home. And the scrolling isn't exactly what you'd call speedy. In fact, it's pathetically slow.

Once DOS Services loads, with its

TopView reminds me of something designed by the government: too many steps and inelegant execution to satisfy the lowest common denominator.

obligatory directory read, you can COPY, PRINT, TYPE, RENAME, or ERASE a file in the displayed directory just by moving the TopView pointer to the proper command and hitting Home. Then you have to move the pointer over to the adjacent directory and slide it up and down the listing of your files until you've highlighted the one you want to work on. If you're logged into the wrong subdirectory, of course, you have to first type in the name of the correct one at the top of the screen where the DOS cursor sits blinking implacably. While the solid-block TopView pointer is hard to confuse with the more familiar, blinking DOS underline cursor, it's tough to figure out which keys move which, especially when you're trying to learn the ropes. To confound the problem, each pulses at a different rate, which makes them fairly distracting when they're close to one another.

DOS Services will also let you use the standard DOS COMP, DATE, DIR, DISKCOMP, DISKCOPY, FIND, MKDIR, SYS, TIME, TREE, VER, and VOL commands and that's it. Everything else summons a nasty "... not supported" error window. And to use these addi-

tional 12 commands, you have to move the pointer to Other, and type them in yourself. The Other option also lets you perform DOS operations on more than one file at a time. For instance, if you want to copy a single file, you can select Copy from the main DOS Services quintet of options and tell TopView which single file to copy simply by sliding the pointer down the adjacent directory listing. To copy all files with a .COM extension, you'd have to select Other and then type the COPY *.COM command in yourself.

TopView is... well... interesting. It can partition off and move windows surprisingly nimbly. You can use it to lop dollops of text off one file and slap them effortlessly onto another. You can jump from one program to another with the flick of a finger. And it's the only software I've ever seen where a mouse might actually come in handy, although a touch screen or light pen would actually be more useful; who has the clear desk space for a mouse?

But TopView is unnatural. It's balky and slow and unintuitive. It didn't take long for me to accustom my fingers to the Home, PgUp, and Alt keys and to scamper effortlessly among programs, but there was something troublesome about the process. It was like making love with your clothes on. It worked, but it wasn't exactly right.

Lowest Common Denominator

Actually, TopView reminds me of something designed by the government: too many steps and inelegant execution to satisfy the lowest common denominator. I'd prefer a pull-down window that would let me type in DOS commands and would then execute anything I typed. The cut-and-paste and the bounce-between-programs features are keen, but who really spends time moving blocks of text or flitting from one program to another? That's just not how most users work.

TopView creates, scales, moves, and hides windows with agility, but windows

COVER STORY

aren't for everyone. Its context-sensitive help screens, its savvy shortcuts (such as allowing a double Alt to zip you from one application to another), and its intelligent use of color are all very classy (although it would be far better if the border weren't a somber black). But TopView refuses to let you execute batch files or some of the more fundamental DOS commands. It won't let you create macros to save repetitive keystroking, and while it seems designed for greenhorns or casual users, beginners can't possibly answer the arcane questions it asks when changing program information—such as the "Range of Software Interrupt Vectors Swapped" or the amount of memory required by different applications.

With memory so cheap these days, and hard disks becoming de rigueur, environments like TopView can really make sense. In fact, they're almost necessary. No one likes to quit an application just to check the free space on a disk. (To learn how to do this under TopView, see editor Bill Machrone's article for a trick for loading COMMAND.COM as a TopView task.) And it's awfully handy to have a database manager sorting a file, or a spooler printing out a long report in the background while you're entering or revising other information at the same time. It's also a pleasure to bounce between programs in memory without having to quit one and wait for the second to load—and better still to move data freely back and forth, (although TopView is picky about which programs it will paste text into).

But TopView doesn't cut the mustard. While it's a step in the right direction, it's far too primitive, awkward, and restrictive. IBM can come up with something spiffier than this. And it may have to—word is that IBM is counting on a grandchild of TopView as its next operating system/environment. From first-hand reports, it will have some stiff competition from MicroSoft's powerful, graphics-oriented, totally DOS-compatible Windows program due in the middle of 1985. ■

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A WIDE OPEN Approach to Integrated Software

Open Access is a complete, integrated package with six strong modules that could be successful as standalones. Even its documentation is a classy production.

Open Access, another entry in the integrated software sweepstakes, is a package without a weak link: each of its six modules is a competent or even stellar performer, whether alone or in conjunction with the others. The package's information management, spreadsheet, word processing, graphics, communications, and time management modules work nicely together. The graphics used in its menus and help screens are beautifully done. And its documentation is among the best I have ever seen. Software Products

Illustration: Cary Henne



International has obviously gone to considerable trouble to make *Open Access* a classy product; except for a couple of bugs, its efforts have succeeded.

Open Access is entirely menu driven. From the main menu you can enter any of the modules, access the program's utilities section, or exit to the operating system. First you enter the current date to permit your files to be date stamped and the time management module to work properly.

Information Management

The information management module is the heart of the *Open Access* system; its files can be used by any other module. It is a relational database that allows 55 fields per record and a maximum of 15 key fields for fast sorting and searching. Its maximum number of characters per record, 1,024, is small, but adequate for most applications. It permits up to 32,000 records per database file. As in other relational databases, *Open Access* allows you to join two or more files by choosing common key fields from each file. You can select only the fields you want to go in the joined file.

You create a new *Open Access* database by specifying all the fields and their attributes (see Figure 1). You can then display all the fields by using the "search" key (F4). You enter information into the new database file by using either the *Open Access* standard input form or a "mask," a form you create. (You can also create masks for reporting.) *Open Access* includes the standard database commands for browsing, retrieving, sorting, changing, deleting, or entering new records in a database. Reporting can be both quick and extensive. The retrieve (or query) function



Open Access

Software Products International
10240 Sorrento Valley Rd.
San Diego, CA 92121
(619) 450-1526

List Price: \$695

Requires: 192K RAM, 256K for graphics, two double-sided disk drives, DOS 2.0. Graphics controller card recommended.

CIRCLE 685 ON READER SERVICE CARD

allows you to search for and qualify records for display or reporting in several ways. The "change" function will work on single or multiple records in a file.

The information management system includes a SIF (Standard Interface File) interchange utility that translates DIF, Text, and *dBASE II* (DBF) data files into the *Open Access* format. It can also translate SIF files into DIF format. The infor-

Software Products
International has obviously gone to considerable trouble to make *Open Access* a classy product; except for a couple of bugs, its efforts have succeeded.

mation management module has its own query language that can retrieve and report information under a wide range of conditions. All its features make the information management module more capable than most standalone database packages.

Spreadsheets

Open Access's spreadsheet, like the database, includes most standard features made popular by the market leaders (see Figures 2 and 3). Its maximum size is 3,000 rows by 216 columns. You can insert and delete rows anywhere within the matrix and quickly access individual cells or groups of cells and edit, blank, copy, or move them with ease. According to the manual, relative copies are also possible, but I could not get this feature to work correctly. When I tried it, I got an absolute copy (+2/A1) copied intact from column B to column C) instead of a relative copy (+2/A1 in column B copied as +2/B1 into column C).

Other standard *Open Access* features include setting column widths, specifying "filler" characters (such as spaces and dashes), and setting justification (left, right, center) and other formatting parameters.

SPI also included some more sophisticated functions. An "automatic form

mode" function, for example, allows you to preselect data entry into a previously designed spreadsheet model or template. This mode allows other people to use your model for calculations; the program stops at specific matrix locations in a specific order. You can also "lock" the first row or column of your table when scrolling so that your row and column titles remain on the screen as you scan the model.

You can open up to six windows into your matrix to view different sections at one time. Each window can be "linked" to others so that when one window is scrolled in a particular direction, the linked window scrolls in the same direction at the same time. You can use several spreadsheets together for large or consolidated applications. Using *Open Access's* "channeling" feature, you can even reference data in one model to use in another without having them both on the screen at the same time.

One of *Open Access's* best features is its sort function. When you use it to sort columns in descending or ascending order, the unsorted columns change accordingly. This feature is helpful, for example, should you want to view all your employee records alphabetically and then re-sort the columns to view them in descending order by salary.

The "goal seeking" function is one of the more popular features in many spreadsheets and is included in *Open Access*. It allows you to do "what if" analysis on a table by varying one or many variables or constants. You can work with tax tables or other, similar applications using the "table" function. This feature references data in other sections of the model according to a formula you build in. Conditional formulas are also possible. *Open Access* includes a host of special financial and other functions to help you with many situations: annuity present value, date, depreciations, future value, internal rate of return, linear estimates, list, modified internal rate of return, payment, present value, table, and time. You can also, of course, move data between *Open Access* modules (say from the database to the spreadsheet).

Word Processing

The *Open Access* word processing module is not as strong as the other mod-

ules, but it is still quite capable. It looks even better when you see what it can do in concert with the database, spreadsheet, or graphics modules. When I compare it to other standalone word processors I have seen, I would rate the *Open Access* module as average. Although it has most of the needed functions, it does not work as smoothly as I would have liked: You have to use several keystrokes to select many of the options or features instead of just one or two (see Figure 4).

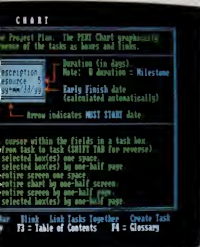
Open Access includes the standard word processing commands and modes. You can create, edit, save, and print documents; insert, delete, copy, move, exchange, and format text. You can set margins, set spacing (both line and character), specify bold type, underlining, italics, page numbering, headers, footers, and wordwrap. These features are available if you are creating or editing a document file such as a letter or report, but not with a text file such as a program. When you create a word processing file, you must choose between these two options. Since many programs and standard DOS files can't tolerate the special control codes and non-ASCII characters normally found in a word-processed document, it is important to specify the Text option for these files.

Open Access allows you to set special markers throughout the text that help you find the marked sections quickly. You can also do a search-and-replace operation on any text. The search function prompts you to enter the number of times you want the "search-text" to be found before it stops, a feature that enables you to find, say, the third occurrence of the word *computer*. The function can find either whole words or parts of words.

Open Access's ability to insert data into word-processed text gives the module extra versatility. You can, for example, "include" a graphics image from the graphics module in a word-processed document. During the printing process, the include function finds the specified graphics image file and prints it right below the word-processed text. The program then continues printing the rest of the text, interleaving text and graphics. Tables of data created from the spreadsheet or database modules can also go into text. This

Name:	Any alphanumeric name up to ten characters in length.	
Unique key:	You can specify a maximum of 15 key fields per record.	
Key		
Non-Key		
Type:	Text	You can specify whether or not to allow uppercase and/or lowercase letters, blanks, numbers, punctuation, decimals. You can also specify the actual size of field, which can be different from display size.
	Date	MM-DD-YY or format that user specifies.
	Number	Integers in the range from -32,000 to +32,000.
	Decimal	Any whole numbers or numbers with decimal points.
	True/False	
Justify:	Left	Repeated across the entire field display.
	Center	
	Right	
	Repeat	
Evaluated:	Normal	No automatic features or qualifications. Automatically places system date in field, and the user cannot modify that date.
	Autodate	
	Form	The cursor is allowed to jump to this field for quick changes
	Skip	Once this field is entered the first time, the user cannot modify the entry.
	Dependent	The value of this field is dependent on another field's value.
	Autoincrementally	A sequence number is automatically inserted in this field.
	Range	An entered value in this field must fall within a specified range.
Video Mode:	Normal Mode-1 Mode-2 Mode-3	Each of these modes sets up special screen attributes of the displayed data and field names for offsetting important information.
Must Fill:	Yes/No	
Display Width:	Width of field as displayed on screen.	
Duplicate:	Yes/No	The value from the last entered record remains in the current field initially.
Must match:	Yes	Specifies that any entered value must match with value in a second file.

Figure 1: Field parameters for the *Open Access* information management system.



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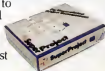
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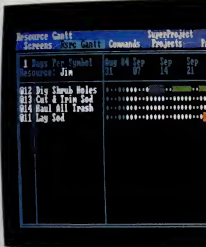
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capability is a real timesaver for reports: You can create financial tables in the spreadsheet and then import the data into the word processor. Mass mailings are also easy; just combine the word processor with the spreadsheet and database modules. Although the word processing module is not as easy to use as *WordPerfect* or *Benchmark*, it is a solid program that performs well.

Graphics

Most people would rather look at a graph than struggle to extract a trend or result from a text full of numbers. A table of numbers is better than the same numbers in a paragraph, but a graph is best of all. The *Open Access* graphics module allows you to present information in several forms. The module takes its data from a spreadsheet file, a database file, or the

keyboard. You have your choice of a simple, three-dimensional, windowed, or overlaid graph. (See Figure 5.) The simple graph can be a bar, line, or pie chart; the three-dimensional graph is always a bar graph with three axes; and the windowed graph combines different graphs on the screen at one time, each in a separate window. The overlaid graph places graphs on top of one another to produce some useful graphs (such as a line graph laid over a bar graph). Some examples of each are shown in Figures 6, 7, 8, 9, and 10.

The module permits you to title the graph itself, title the different axes, set the desired and actual minimums and maximums for the data, set numerical intervals for the axes, and choose the different colors to be used. The view function allows you to choose the size, shape, color, and location of your different charts and graphs. You can even design outlines and textures for your graph by using squares, diamonds, circles, and triangles to make outlines, lines, endpoints, and different patterns to fill in bar and pie charts.

One other interesting feature of the *Open Access* graphics module is its ability to create "slide shows." You can save many graphs in a particular order, grouped in what *Open Access* calls a "carousel." Later, you can reorder these graphs and then display them on the screen one at a time with a pause between graphs. You can also save a graph in an ASCII file that can be included in a word-processed document file, as I mentioned earlier. *Open Access* is a strong package; unfortunately it does not let you draw just anything. Its graphs must be based upon numerical information.

Communications

Another important part of any integrated office system is a communications program. *Open Access*'s communications module is very good, much better than many of the existing standalone systems on the market today. This module, like the others, includes all the standard commands plus some nice extra features.

The module lets you configure your system as a dumb terminal or set it up to look like any one of many other terminals. You have complete control over baud rate, data word size, stop bits, parity, duplex,

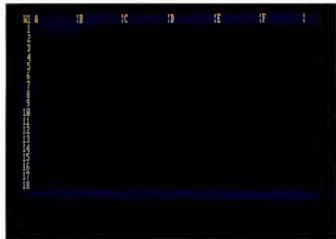


Figure 2: A screen of the *Open Access* spreadsheet module.

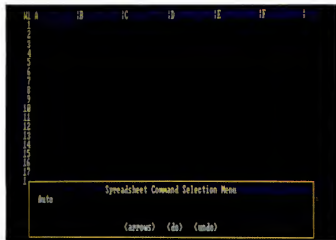


Figure 3: A screen of the *Open Access* spreadsheet menu.

break characters, stop and send characters, long and short delay characters, answer sequences, dial sequences, hang-up sequences, and so on. Each of these parameters can be saved under a different configuration filename. The module initially offers you several configurations to use or modify. When I used the HAYES.LPR configuration file for my Hayes 1200 Smartmodem, everything worked well.

One of *Open Access*'s extra features is its ability to create and modify telephone lists for automatic dialing. It also permits you to upload files to a host computer. The LOG_FILE command sets up a file to contain all the information received over the modem when your system is emulating a terminal, a useful feature if you want to record information sent from The Source or other information network systems. Lastly, the master/slave option sets up a link between two or more computers using *Open Access* that enables the master computer to rename, delete, or copy files from any of the modules to any other system. You operate on these files one at a time or in groups using the batch mode. The manual says a forthcoming program update will allow you to add passwords to the logon procedure in the master/slave mode. This statement could hint at a forthcoming full network capability, which is the only thing lacking in this module.

Time Management

Time management software is not usually included in most integrated or combination systems. The *Open Access* module offers both a calendar system for making notes and appointments and also a card file system for addresses. Several people using the same computer and *Open Access* package can share the card file information. You keep your appointments separate by entering your name at the beginning of each time management session. Once you've done this, you can get at your own appointments only during that particular session.

The appointment system allows you to schedule one-time or recurring appointments. With each appointment, you can associate the date, time, personnel, subject, and pertinent notes. You can allow overlapping appointments if you wish and later display them to review conflicts. The

calendar feature makes it very easy to create and cancel appointments. An "auto" appointment feature makes daily, weekly, or monthly appointments all at once. An "hours mask" feature can create certain times that appointments should never be made, such as during lunch hour or during time reserved for your family. A search feature will let you display either all your appointments with a particular person or

group, or all appointments that have to do with a certain subject. This feature comes in handy, for example, when you have forgotten the date of your meeting with the bank president. You merely search the "With" field for "bank president." You can search both the With and Subject fields if you need to. You can print any day's entire appointment schedule or any single appointment. Unfortunately, *Open*

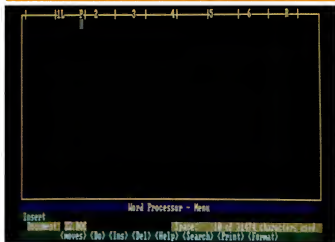


Figure 4: The menu of the *Open Access* word processing module.

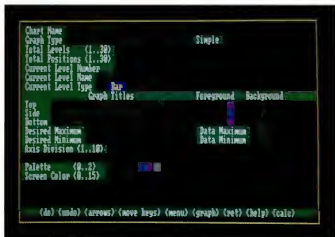


Figure 5: A screen from the *Open Access* graphics module.

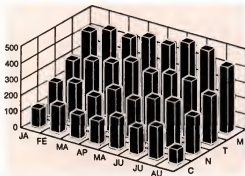


Figure 6: A sample three-dimensional bar graph.

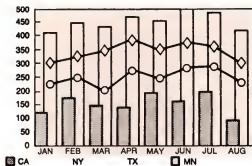


Figure 7: An Open Access combined line and bar graph.

Access doesn't let you print the calendar as it appears on the screen, an option that would have been helpful.

The address card system is for managers who want an "automatic Rolodex" containing name, address, and phone number. The system allows you to add, modify, and delete any address card. You can search for any name and then display the information about that person or business. For anything more complicated, you would most likely want to use the information management module.

Other System Features

Open Access has many small features that are not part of any particular module but are accessible from all. One of these

system-wide features is its help function. When you press one of the function keys, a help window appears on the bottom half of the screen, giving assistance and information that pertains to what you are doing. For example, if you are in the spreadsheet module and want to find out the available commands and their functions, you would press the help key. Again, if you had entered a command that requires parameters but did not know what the parameters were, you could find out by pressing the help key.

Pressing the help key a second time opens a second window, overlaid on the first, that displays what each of the function keys does for each of the different modules. The Esc key accesses the undo

function, which closes the windows one at a time, starting from the last one displayed. You could almost run the system without the manuals by using just the help facility and the *Open Access Pocket Reference Guide*.

Another nice feature is the calculator. At any time, pressing the "calc" key (F8) opens a calculator window in the upper part of the screen in which you can do some quick calculations without leaving the current module or interrupting your work.

The "search" key (F4) produces another window that contains all the files that you can enter when a module prompts you for a filename. If you are in the graphics module and are prompted for a filename, pressing the search key produces a window in the middle of the screen listing all the graphics files. Database, word processor, spreadsheet, and other files are not listed since the graphics module cannot use them. (You can, of course, generate a graphics-compatible file from a database or spreadsheet file, but a transformation must be performed on it first.)

Utilities

The last option that is listed in the *Open Access* menu is Utilities. If you select this option, you get another menu with three choices: Configure, FixFile, and SIF Interchange. The Configure option allows you to set up such system parameters as printer identification, format for date fields (MM-DD-YY or DD-MM-YY), decimal character (period or comma), screen type, communications configuration default file, time management default user, and the order in which disk volumes for files are checked. The Configure option is also able to assign strings of characters to function keys. All of these parameters can be changed and saved at any time.

The FixFile option looks at a designated file created in the information management module or time management module and checks for database errors. If it finds any, it attempts to correct them. That is all it does.

The SIF Interchange option allows you to use outside data. It changes DIF, dBASE II, and text files to the *Open Access* SIF format and, conversely, transforms

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(*) Benchmark run on an IBM PC using MS Pascal version 3.2 and the DOS linker version 2.8. The 179 line program used is the "Gauss-Seidel" program of Alan R. Miller's book: *Pascal programs for scientists and engineers* (Sybex, page 128) with a 3 dimensional non-singular matrix and a relaxation coefficient of 1.0.

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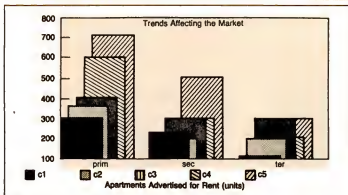


Figure 8: An overlay graph superimposes bar data.

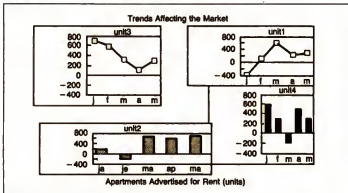


Figure 9: A windowed line/bar graph.

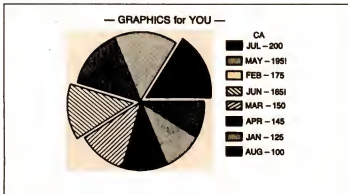


Figure 10: An exploded pie chart.

SIF files into DIF files. The option supports three text formats: Dow Jones, Array, or Stream.

Data Integration

Although the *Open Access* modules all work well together and permit easy exchange of information among themselves, the package unfortunately does not work from one big database. Updating data in one module will not affect data in another. *Open Access* allows 18 different file types that are used for different purposes. A special brochure comes with the documentation to explain how to exchange information among modules and with outside packages. *Open Access* has three ways to accomplish these exchanges: SIF files, Text files, and the "context" function. The SIF and Text files are in formats that most modules can accept to load data. The context function can be used in most modules to save information in a format that another module is able to recognize. The manuals explain which method or methods can be used when transferring information from any module to any other module.

Documentation

Open Access's documentation is massive. You receive a big box with a *Training/User* manual, a large *Reference* manual, a *Getting Started* manual, an explanation of *Open Access's* data integration, a *Pocket Reference Guide*, several errata sheets, and warranty information. The manuals are well done. The *Training/User* manual has a system overview followed by sections for each module. The *Getting Started* manual is a quick and invaluable reference for new users. Despite a few misspellings and omissions, Software Products has obviously put a lot into the manuals. Examples are included wherever possible. The *Pocket Reference* and the function key overlay make it easy to use the system without constantly referring to the manuals.

Open Access is one of the best packages I have ever seen for the IBM PC and the best integrated package I have ever worked with. I found few bugs, and I loved the use of color graphics and windows. The help feature is one of the best in the business. ■

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IBM's Wheelprinter couples conventional daisywheel technology with an exceptional paper-feeding system, while its Quietwriter introduces moderately priced, high-quality, thermal transfer printing.



It has always amazed me that IBM, the company that brought out the Selectric typewriter, the first high-speed laser printers, and the legendary 1403 "Nancy-One" batch printer, couldn't produce a decent printer for its best-selling microcomputer. Someone at IBM apparently agreed and assigned the job of correcting the situation to IBM's Information Systems Group, which developed two new series of typewriters, the Wheelwriter and the Quietwriter, with PC printer companions—the Wheelprinter and Quietwriter printer.

Both series of typewriter-based printers are targeted at the medium-performance office-printing market. The typewriter versions can double as PC printers, but

they sacrifice some capability when compared to the printer-only versions. Both printers offer letter quality printing, and, although IBM does not intend to discontinue its standard Selectric models, the new typewriter-printers can be expected to cut into its sales of the famous "golf ball" typewriters.

While the Quietwriter series adds thermal transfer printing to IBM's technological portfolio, the Wheelwriter and Wheelprinter use traditional daisywheel technology. One way to view IBM's simultaneous introduction of both printers is that it wants to satisfy its conservative customers along with its more technologically daring ones; another viewpoint is that IBM is not fully confident of thermal technology.

IBM PRINTERS

The Wheelprinter

The IBM Wheelprinter, a basic 25-cps daisywheel printer that comes with both a forms tractor and single-bin sheet feeder as standard equipment, can handle single sheets more intelligently than most printers. But its \$1,795 price tag and compatibility problems may have you heading for the competition unless an IBM logo means everything to you.

Like most daisywheels in its performance class (effective print speed of just over 26.5 cps in *PC Magazine's* standard printer speed test), the Wheelprinter is mild-mannered enough for a crowded office work area. At a rated 59 dBA, it's not particularly noisy (the sound cover is

The Wheelprinter has a tractor feed and a cut-sheet feeder built in, and it's easy to switch from one paper-handling mode to another.

very effective despite its lightweight looks), not very large (30.5 inches wide by 22.5 inches deep by 15.5 inches high without the sheet feeder), and not very heavy (33 pounds). It is also attractive, in its own putty-colored way.

Its print quality is good, but that's to be expected from all daisywheels, including today's bargain-basement \$300 models. What makes the Wheelprinter stand out from the pack is its simple, flexible, and reliable paper-feeding system.

Most daisywheel printers come equipped with only a platen feed and can be equipped with a separate forms tractor that is usually available at extra cost. Some offer a cut-sheet feeder as well, which is also sold separately at extra cost.

In contrast, the Wheelprinter, which is basically a platen printer, has both a tractor feed and a cut-sheet feeder built in, and it's easy to switch from one paper-handling mode to another. All it takes is flipping one switch (a large toggle, not a DIP switch), opening or closing one of the various paper-access doors, and inserting or removing the cut-sheet paper hopper.

Single-sheet feeding is a real joy on the

Wheelprinter. It can print accurately on manually fed sheets from the 1st to 66th line of a page. When a sheet runs out, the Wheelprinter takes itself off-line and beeps to tell you to insert a new sheet, and signals your PC not to send more data until it's ready. Some software—*XyWrite II-Plus*, *Volkswriter Deluxe*, and *Multimate*, to name a few—handle this situation well and give you an additional message that your printer isn't ready and needs attention.

The Wheelprinter's cut-sheet feeder is a model of design integration and simplicity; the rest of the printer industry should take a good look at it. To use it, all you have to do is open an access door at the back of the printer and insert the paper hopper.

The hopper, which looks for all the world as if it were swiped out of a copying machine, has no moving parts of its own, which means there are no gears to mesh and no cables to connect. It's so easy to mount on the printer that I tried it three or four times before convincing myself I'd done it correctly.

You have to load the paper into the hopper when it's out of the printer, but this doesn't necessarily interrupt printing. Just slide the hopper out while a page is printing, reload it, and slide it back in. If you don't get it back in time, the same logic that detects a lack of paper in single-sheet mode tells you to hurry up and put the hopper back in the printer. Unfortunately, the design does limit the Wheelprinter to a single paper bin and the feeder to 8½-inch (standard width) paper.

The Wheelprinter's tractor is equally easy to use. Just set the forms-type switch, adjust the platen lever, remove the sheet feeder, raise the rear cover, and you're all set to load paper into the Wheelprinter's tractor feed.

Loading paper into the tractor for the first time can be frustrating—not because loading the paper is difficult, but because it's difficult to get used to the idea that there's no platen knob on the printer to adjust the paper, only little buttons on the front that move the paper up and down. Once you're over this psychological hurdle, loading continuous forms into the Wheelprinter is really no more difficult than it is on most matrix printers, and eas-





IBM PRINTERS





ier than with most daisywheels equipped with tractors.

My only serious objection to the tractor design is the rear paper-entry opening, accessed by raising the lid on the rear of the printer. Once you open it, you have to be careful around the printer because anything heavier than a paper clip will knock the lid back down and jam the paper. Finding the correct opening under the cover is also a little tricky at first. The tractors themselves could cause problems down the road. Although they functioned well enough while I used the printer, they seemed flimsy and looked as if heavy or careless use might break them.

A Vexing Mismatch

The one place where the Wheelprinter falls down on the job is in compatibility with the rest of the printing world. IBM claims that its new printer is fully compatible with the IBM PC Graphics Printer, which is made for IBM's Entry Systems Division by Epson America. Scratch out "fully" and you'll have a more accurate description of the relationship between the Wheelprinter and the rest of IBM's PC printer line.

Like most daisywheels, the Wheelprinter can't produce the full IBM PC character set. Unlike most, it prints minus signs in the high-order character positions instead of repeating the low-order character set. But the major incompatibilities with other IBM PC printers have nothing to do with the character set.

The Wheelprinter forces you to adjust or abandon almost any software set-up for the IBM Graphics or Color Printer. The biggest problem is vertical line spacing. Many word processors use the Graphics Printer's ability to step in 72ds of an inch. Unfortunately, the same printer commands cause the Wheelprinter to step in 48ths of an inch, resulting in line heights 50 percent higher than expected. That means single spacing becomes one-and-a-half spacing and double spacing becomes triple spacing.

The Wheelprinter lacks print features equivalent to the Graphics Printer's emphasized and double-strike modes, which darken the printing. Most daisywheels have bold and/or shadow print modes to approximate emphasized and double-

strike printing, but not this one.

This difference should not be a problem if your word processor knows how to restrike characters or parts of a line to darken portions of the text. However, the Wheelprinter exhibited severe horizontal and vertical character registration problems when I used *Volkswriter Deluxe* in this fashion. The registration errors made the darkened characters look blurred and uneven.

The Wheelprinter's flexible paper-handling design may give it a leg up in the office market, but its price may kick the other leg out from under it.

Other differences are minor and are due to the printer's special capabilities. For example, the Wheelprinter features proportional spacing, has a setup command sequence, requires both left and right margin settings, and allows you to download a printwheel table. You must use the margin settings to properly align the margins when using the cut-sheet feeder if you plan to center your documents on tractor-form paper.

The Wheelprinter is good, but not great. Its flexible paper-handling design may give it a leg up in the office market, but its price may kick the other leg out from under it. Its compatibility problems and lack of some key word-processing features may also keep many potential buyers away.

IBM can expect stiff competition for its new daisywheel printer and its paper-handling design. Look for the new, inexpensive cut-sheet feeders that are expected to drop out of the Eastern skies in the near future.

The Quietwriter Printer

Everyone in the printer and typewriter business would like to get out of the noise-producing business their products have put them in. Several companies have introduced solutions to the printer noise problem in the past year, and IBM is one of the

IBM PRINTERS

latest entrants. The company's new \$1,395 Quietwriter Printer uses an innovative thermal transfer printing technology to produce letter quality images without much banging.

Thermal printing is not a new technique, but thermal transfer printing is. Traditional forms of thermal printing have been employed for years on teletype machines and time-sharing terminals. However, the older techniques use heat-emitting electrodes in the printhead to heat specially treated paper, forming images where the paper is heated, usually in a dot matrix pattern.

Thermal transfer printing, on the other hand, uses electrodes in the printhead to create an image by melting ink embedded in a wax base carried to the paper by a plastic film ribbon. The character images are made up of dots, as with older thermal printers or normal impact dot-matrix printers, but the newer electrodes are tiny and yield characters with higher resolution than the older technologies will allow. The Quietwriter Printer's 40 electrodes form characters at 240 vertical by 360 horizontal dots per inch (dpi). In contrast, the IBM PC Graphics Printer prints at 56 vertical by 120 horizontal dpi.

The Extras Cost Extra

IBM's Quietwriter Printer is unique because it is the first moderately priced, high-quality thermal transfer printer on the market. The thermal transfer printers from Apple Computer and Okidata are low-end (about \$300) machines, while the Diablo

EPM-1 is a \$4,000 high-end machine designed for high-volume printing and more closely resembles a copier than a printer.

Like the new Wheelprinter, the Quietwriter Printer feeds single sheets manually but can be equipped with a forms tractor or cut-sheet feeder. Unlike the Wheelwriter,

The Quietwriter Printer is, indeed, quiet. At a rated 53 dBA it makes less noise than any other type of printer except lasers and inkjets. But this does not tell you about the quality of its sound.

the additional forms-handling equipment costs extra—the forms tractor goes for \$75 and the sheet feeder for \$350. IBM plans to release the cut-sheet feeder sometime in the second quarter of 1985. A Quietwriter Printer equipped to match the Wheelwriter's paper-handling abilities would cost \$1,820.

The Quietwriter Printer is small (19.75 inches wide by 14.5 inches deep by 8 inches high) and light (20 pounds), but its looks, control design, and layout leave something to be desired. It lacks a platen knob, and the front panel's dual-function

switches can be complicated to use (one switch is the "code key" that enables the second function in the other keys). IBM put the power switch on the top left-hand side of the cover, about where you might expect to find a platen-release lever.

The thermal technology allows changeable fonts, and the Quietwriter Printer uses interchangeable font cartridges (like those in the TI 855) that cost \$50 each. The printer holds two; however, only one can be active at a time. (You are able to switch between them with escape sequences). Four cartridges are currently available with the full PC character set, while 19 more have only a standard typewriter character set (these were actually made for the typewriter version of the Quietwriter). The Quietwriter's \$12 ribbons yield about 160,000 characters (roughly 80 double-spaced pages).

Quiet Limitations

The new printer fulfills its objective of offering relatively quiet, high-quality printing, but it's not without its limitations and problems. First off, it requires a smooth-surfaced paper, such as xerographic (copying) paper, to do its best job. Any other paper makes its output look like it came from a correspondence quality dot matrix printer with a weak ribbon and will leave you wishing for the clatter of your old daisywheel.

You can compensate for incorrect paper (standard business-grade fabric bond, for example) by increasing the contrast (controlled by an easily accessible

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The Quietwriter printer requires a smooth-surfaced paper, such as xerographic (copying) paper (see the middle sample) to do its best job. Any other paper makes the output look like it came from a correspondence quality dot-matrix printer with a weak ribbon. For example, the sample on the left was printed on fancy letterhead, the sample on the right on bond paper.

switch under the cover), but IBM warns that increasing the contrast will decrease the life of the \$20 replaceable printhead. And even so, my experience indicates that increasing the contrast does not enable the Quietwriter Printer to produce letter quality output on standard paper.

The printer's paper handling complicates the paper problem. The Quietwriter Printer takes manually fed single-sheet paper, but unless you adjust the printer by moving the paper bale lever in combination with a front-panel switch or sending an escape sequence, it will keep on printing after each sheet runs out. Loading any type of paper into the machine requires a difficult-to-master procedure, so loading single sheets can become especially tiresome.

The four tractor fixes this problem but leaves you with the print-quality problem. (IBM did not supply a tractor feed for testing, but you need one if you plan to use continuous-form paper and want to keep it aligned.) An IBM official said that most types of word processing paper meet the Quietwriter Printer's paper requirements, but my experience with two different types of word processing bond led me to question this pronouncement.

The cut-sheet feeder will fix all this, but you'll still have to print your best corporate correspondence on xerographic-grade paper to get good results from the Quietwriter Printer. Any takers?

Sound and Speed

The Quietwriter Printer is, indeed, quiet. At a rated 53 dBA, it makes less noise than any other type of printer except lasers and inkjets. By itself, however, this statement does not tell you about the quality of its sound. While the pinhead itself works quietly, the ribbon advance and carriage return mechanisms make an annoying (though muffled) series of hacking and wheezing noises that make it sound like a sick puppy.

IBM rates the printer at 40 to 60 cps, and *PC Magazine* tested it at 25 cps. Although not particularly fast, the QuietWriter Printer about matches the speed of most similarly priced correspondence matrix printers in quality mode. Its unidirectional design (apparently required by the design of printhead) slows things down

somewhat and also produces the wheezing sound as the printhead makes its return. The Quietwriter Printer unfortunately, offers no high-speed draft mode.

The printer is highly compatible with IBM's PC Graphics and Color Printers. It lacks a boldface print mode, and you must change font cartridges to get compressed printing, but neither difference is fatal. The machine's lack of graphics capabilities is disappointing—its 240 × 360 dpi resolution could have yielded spectacular graphics printing.

Cool to Thermal Printing

I liked the Quietwriter Printer more and more as I got used to it, but I'm not convinced it presents the best solution to the noisy printer problem. Under the right circumstances, you could reasonably call its output letter quality, although a discerning eye can still tell the difference. However, the Quietwriter's requirement that you use substandard paper to achieve that quality obscures its value as a business printer.

IBM's new printers are not going to set the printer industry on fire. Despite its wonderful sheet feeder, the Wheelprinter does not offer an astounding price/performance package, and only a stalwart IBM fan would replace a Brother, Juki, C. Itoh, or other Japanese daisywheel with IBM's new model.

The Quietwriter Printer has potential as a quiet solution to letter quality printing, but the new technology is just not up to the job—yet. Given time, I'm sure that IBM and its competitors will solve the paper problem and bring thermal transfer printing quality up to acceptable business standards. For now, stay with daisywheels (even IBM's Wheelprinter) and keep using your 100 percent rag content bond stationery. ■



IBM Wheelprinter
IBM Quietwriter Printer

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GOLDBase:

Truly As Good as Gold?

GOLDBase is a plain vanilla file manager for novice and expert alike. It is a tool for the novice who wants a minimum of unpleasant surprises. And it is a tool for the expert who can link it with the optional *BASIC Programmer's Interface* to create a sophisticated database system. With its clean design and its no-nonsense approach to data handling, GOLDBase gives you easy access to the kind of quick-and-dirty file management that many feature-laden products stumble over.

Buying the *BASIC Programmer's Interface* allows you to call on many GOLDBase features from BASIC. This interface makes GOLDBase a fairly serious data management tool, but only for those who have already become expert in BASIC. Novices who become proficient with GOLDBase will want to move on to more feature-packed applications packages rather than experiment with BASIC. Nonetheless, many will continue to reserve a small but valuable place for GOLDBase in their software libraries. And, while the *BASIC Programmer's Interface* may be rudimentary compared to some other development products, developers always need to perform rapid feats of code cutting to meet an occasional interim problem. They, too, will find a use for GOLDBase.

GOLDBase offers a cluster of modest, reasonable features for design of a data file, file management, macro construction mixing commands and interac-



GOLDBase offers PC users a cluster of reasonable database management features—at a price that's a bit too steep.

tive prompts, "screen painting" of desired print reports, and form-letter generation through the insertion of fields into free text. It may be unexciting, but it is useful, and, in the field of database management, "useful" is the greatest compliment you can pay a product.

The User Interface

It is always a great pleasure to encounter a user interface that, while a bit clunky, is easy to manipulate. The GOLDBase interface is simple because it uses little typical database jargon, a consistent and extremely easy-to-follow menu-based command structure, and forms-oriented data entry.

This forms orientation extends throughout GOLDBase and encourages you to "paint" file definitions, create forms, and

print reports directly on the screen.

The one break in this otherwise simple scheme is the way the function keys have been assigned. The designers decided to allow function key meanings to vary among the different modules of the program. This flexibility may be one of those features that are hard for beginners to keep straight but useful for experienced GOLDBase users. Nevertheless, this system goes against GOLDBase's design intent, which otherwise insists on the utmost simplicity and consistency. Unlike an integrated product such as *Symphony* that spans different applications and needs such flexibility, GOLDBase would be better off without it.

In keeping with its novice orientation, GOLDBase makes heavy use of menus. The main menu lists the system

functions (such as data file design and management) that glue the program together. You can access a utilities menu from the main menu that forms a grab bag for odds and ends.

These utilities enable you to import data from DIF, flat ASCII, or mailmerge-style files. However, to do so, I first had to run the data through a BASIC program I wrote to remove delimiters. Other utilities support creation of file indexes and permit database compression and file deletion. Other main menu choices permit you to choose color configurations and list all GOLDDATABASE files on a given disk.

From the main menu, other menus chart pathways through the product's various functions.

Commands

The simplicity of the menus is matched by the simplicity and consistency of command choices from within most modules. When creating files, constructing macros, generating reports, and building form letters, the menus all offer you the same simple choices.

The NEW command allows you to create something for the first time. The DISPLAY command lets you look at something you've already done. The EDIT command allows you to change something you've already done, and the COPY command allows you to make a duplicate. When you're finished with one of these operations and skip out of it, a menu display at the bottom of the screen lists several command options:

CONTINUE, QUIT, RESTART,
SAVE.

GOLDDATABASE is not a database management system but a flat, relational file-management tool. It supports 100 fields



GOLDDATABASE

Goldata Computer Service, Inc.

2 Bryn Mawr Avenue
Bryn Mawr, PA 19010

(215) 525-1036

List Price: \$350

Requires: 192K, one disk drive, DOS
2.0, monochrome monitor.

CIRCLE 688 ON READER SERVICE CARD

per file with 1,022 maximum bytes per record. It requires 192K of memory (a bit much, perhaps, for a program aimed at the novice), but the number of records per file is only limited by the size of the disk.

GOLDDATABASE is not completely relational. The JOIN command only shifts you to a second file whose selected values match those of the first file. Two files can, however, be genuinely joined on a common field for printed report output, making GOLDDATABASE nominally fit PC's "Project: Database" Category 2 (see Volume 3 Number 14).

Data files can distinguish between date, alphanumeric, integer, and real number

The simplicity of
GOLDDATABASE's
menus is matched
by the simplicity
and consistency of
command choices from
within most of the
package's modules.

data types, and you can call for the mandatory input of data into requested fields as well as for range checks on date, integer, and real values. It supports computed fields. The latest version of GOLDDATABASE permits verification checks of alphanumeric input against indexed values in another file—a nice, sophisticated feature. Unfortunately, field names are now restricted to six alphabetic characters, although the company says this will be expanded in an upcoming version.

GOLDDATABASE, appropriately enough for its novice audience, doesn't ask you to specify data types as such for individual fields. It just instructs you to enter the pound sign (#) on-screen for dollar values, the percent sign (%) for alphabetic characters, the ampersand (&) for dates, and so on. How long do you want your field to be? Just type in the pound sign as many times as you need. This visual approach is less confusing than the classic data dictionary construction.

When the data file design is completed, you are prompted, but not forced, to

inspect the results on screen or to dump them off to the printer. You can easily access the data file definition screen on the fly from other program modules—a small but valuable feature often overlooked in more-expensive products.

Forms

In keeping with its simple user interface, GOLDDATABASE permits "screen painting" when defining field titles, field lengths, and data types. The program then prompts you for a formal field name, range verification criteria, and so on, for each "painted" area. This process defines a file and constructs an input form in one simple step.

GOLDDATABASE also applies this forms approach to the specification of reports. Again, you "paint" reports onto the screen. Since the program already knows the field type for each record, you need only type an asterisk (*) on each line. After you "paint" the form, the computer prompts you to ensure that formal field names are matched to the field values you have mapped on the screen.

Currently, you can only attach one input screen to each data file.

Command Lines

Although GOLDDATABASE relies heavily on a menu-based interface, the file management module wisely incorporates a command line approach with commands listed in abbreviated form. You don't have to tortuously thread through menus when you need immediate information.

Data forms are, to be sure, displayed on the screen exactly as specified when you created the file. However, a command line at the bottom of the screen lists the 20 or so available management commands (ADD, FIND, NARROW, REPLACE, and so on). To invoke a command, you need only type the command plus any desirable arguments or conditions (FIND SALARY GT 20000) onto the command input line.

Selection Set

GOLDDATABASE organizes its file management around the concept of the "selection set," a subset you choose of the available records that you can further narrow for reporting and housekeeping purposes. You create a "selection set" by simply

using the FIND command from the file management module's command line. You also must specify a single FIND condition. If the specification is FIND SALARY GT 50000, this command would put records for all employees who make more than 50,000 into the selection set. Selection is quite rapid, and you are quickly told how many records are qualified for the subset.

The selection set is extremely useful. In files that span many records, the use of a selection subset can speed retrieval processing. A specified field can be globally replaced with another field value throughout the selection set.

To save results of selection set activity to disk you use the TRANSLATE command, which permits the set to be called in later for further processing. But caution is necessary when naming the selection set. It's easy to create many sets and subsets with cryptic names you won't remember later. Indeed, you might find that files and selection sets end up hurtling around the disk in a state of disarray. It is tempting to save and play with sets and subsets without documenting or tracking the changes that you make to them or the purpose for which you created them.

Macro Construction

GOLDATABase has a useful macro feature that lets you freely save and recall batchlike files, employing them to capture repetitive command sequences. These command sequences could include routines that automatically select appropriate records and then prompt data input personnel to replace data in specified fields, or routines that call for a new sort to reflect file changes, and so on.

Macro file creation is extremely easy. With the aid of the package's simple but adequate text processor, you can type in **GOLDATABase** commands and mix them with interactive prompts (signaled to the computer by embedding an asterisk in a macro prompt line), requests for files to be loaded during processing procedures, and so on. A macro file is nothing more than a list, line by line, of **GOLDATABase** commands from the file management module, attached to desired criteria.

After you have created and saved a macro file, you execute it by naming it

GOLDATABASE

Manufacturer

Goldata Computer Service, Inc.
2 Bryn Mawr Avenue
Bryn Mawr, PA 19010
(215) 525-1036

Price

\$350.00

Category

2

SYSTEM SPECIFICATIONS

Maximum number of record types per database

1

Maximum number of fields per record

100

Maximum record size

1,022 bytes

Maximum number of records per file

Limited by disk space

Maximum number of records per database

Not applicable

Maximum field size

80 bytes

PERFORMANCE MEASUREMENTS

Time to enter standard data

20 minutes

Time to extract a random record

4 seconds

Time to prepare standard task

5 minutes

Time to execute standard task

15 minutes

Size of database created

500 records

Space compression used?

No

Variable length of fields supported?

No

Number and size of ancillary files
Catalog and selection set files; user does not have access to these.

Degradation with additional indexes

Not applicable

Time to perform sort

3.5 minutes

Time to create a standard report

10 minutes

Time to execute standard report

30 minutes

Minimum hardware/software required

192K, one disk drive, DOS 2.0, monochrome monitor

Suggested hardware/software configuration

192K, two disk drives, DOS 2.0, color monitor

Hardware/software configuration used in testing

XT, 512K, DOS 2.0, color monitor

from within the file management module. As each line of the macro file executes, the commands it incorporates are displayed on the screen.

Although the documentation casually calls macro construction "procedure definition," it really isn't. **GOLDATABase** doesn't make any use of program control flow or branching based on logical conditions. Fortunately, the **BASIC Programmer's Interface** provides this procedural language. Another drawback to macros, possibly of little significance to novices, is that you are not allowed to modify **GOLDATABase**'s menu interface. This means that you can't create your own menus and merge them with the **GOLDATABase** structure.

Report Generation

GOLDATABase permits both 80- and 132-column report formats. You use the same "screen painting" form design process to define reports as you use for files.

The program allows you to attach any number of reports to a given file and direct them to the screen, the printer, or to a communications port. Since they can be displayed on-screen, reports can also serve as an easier way than selection sets to view subsets of fields and values from the same file.

The **BASIC Programmer's Interface** permits programmer control of data communication. This feature allows you to send **GOLDATABase** reports off-line. This

capability is one example of how an experienced programmer can use the *BASIC Interface* with *GOLDDATABASE* commands to create an application that is more than the sum of the program's admittedly pedestrian parts.

Form-Letter Generation

Using the simple *GOLDDATABASE* text editor, you can create form letters by embedding field names within free text. The text editor functions at the level of a simple full-screen, cursor-driven facility with a few supplementary editing features (inserts, block moves, deletes, and so on) that you'll quickly learn.

A typical entry that a user would make might be a memo. At points in the memo where you want to insert field values, you type the field name inside angle brackets. The program associates the form letter with the needed data file and later folds the desired field values into the otherwise standard text.

Interestingly, although text editing is also part of other *GOLDDATABASE* functions, the manual does not describe text editing as a separate facility. Text editing is so easy to use that it requires little more than a knowledge of cursor and insert key positions and the meaning of several function keys assigned to block moves and centering of text.

Jargon Free

GOLDDATABASE has struck a blow in the war against jargon by incorporating Boolean logic into its query language without ever mentioning the term in its manual. Although Boolean logic is critically important in data processing, it is invariably one of the most difficult concepts for beginners to grasp when it is abstractly presented.

Most database manager manuals are reduced to gibberish when they try to help you understand the meaning of ANDs, ORs, AND-ORs, and other ways of linking two selection criteria.

Fortunately, only the words and not the functions have been removed from *GOLDDATABASE*.

To perform an AND query in *GOLDDATABASE*, you first choose a selection set based on a single criterion. If you choose

FIND SALARY GT 20000, the *NARROW* command, logically enough, would then "narrow" or further cut the subset according to a second criterion. (Thus, the command FIND SALARY GT 20000 followed by *NARROW* AGE LT 40 will first assemble the selection set of all records with a salary field greater than 20,000 and then narrow that same subset to those records where the value for age is less than 40.) FIND used with *NARROW* has the effect of a Boolean AND without actually using one.

BASIC Programmer's Interface

The *BASIC Programmer's Interface* option is sold separately from *GOLDDATABASE* and comes with its own floppy disk and documentation. It allows you to hook into *GOLDDATABASE* from BASIC and then use retrieved data as desired. You can't call BASIC code from within *GOLDDATABASE*. Not all *GOLDDATABASE* facilities are accessible from BASIC. The following *GOLDDATABASE* commands can be called: ADD, BASE, EXPAND, FIND, GET, INPUT, KILL, MODIFY, *NARROW*, OPEN, and SORT. The *Interface* also has communications routines for dialing and exchanging data, and it provides the much-needed procedural language.

With the *Interface*, *GOLDDATABASE* can serve as a simple forms entry point, and data can be sent to and from mainframes that can do the truly sophisticated data management and analysis that *GOLDDATABASE* does not pretend to do.

To initiate the process, you assign a syntactically correct *GOLDDATABASE* statement (FIND SALARY GT 20000) as a BASIC string to a *GOLDDATABASE* string variable. You then invoke an *Interface*-coded subroutine that routes the request back through *GOLDDATABASE* for processing. You can use an "error string variable" to report a failure to achieve the specified goal.

At the conclusion of this process, control returns to the BASIC program, which will then go on to behave like any other piece of BASIC code. The *Interface* supports IBM interpreted BASIC for building source code but includes its own custom compiler and link for cranking out the final product.

Its sensibly designed features and accessibility make *GOLDDATABASE* almost as good as gold. I don't, however, much like its documentation or its price. The documentation is, to be fair, acceptable. But its aesthetics are poor and its instructions too brief in some places. The manual is bound in dreary battleship gray and is typeset in a confusing way that makes it difficult to distinguish conceptual subsections within chapters. And although concision is normally a virtue and is in line with the entire design of the product, the manual should cover some subjects in more depth. Surely novices in particular would benefit from a brief written tutorial that details the actual process of building a small *GOLDDATABASE* file application. Novices also need a bit more explanation of the unavoidable data processing jargon that cannot be squeezed out of any computer product (the glossary definitions of *programmer* and *bug* are not what is needed). Even though some well-done help screens are available on-line, they don't go beyond the material already covered in the manual. In sum, there is room for substantial improvement here.

There is also room for substantial improvement in price. *GOLDDATABASE's* capabilities put it in a category of database software usually priced between \$100 and \$300. While *GOLDDATABASE* is undeniably useful for most file management tasks such as mailing lists and simple accounting, it does have its limits. Its \$350 list price is, in my opinion, too much—particularly when you consider that the *BASIC Programmer's Interface* costs an additional \$395. Its lack of a significant intermediate level of functionality might tempt many to look elsewhere for more serious data applications. A price drop (say, to \$225) might double sales.

The developers should consider offering "power packs" that would enhance the untouched kernel of *GOLDDATABASE*, allowing intermediate users to add power without learning BASIC programming.

Despite these criticisms, *GOLDDATABASE* is a clean, honest product in an industry that is increasingly promising more than it can deliver. Even with its limitations and at its current price, *GOLDDATABASE* is worth consideration. ■

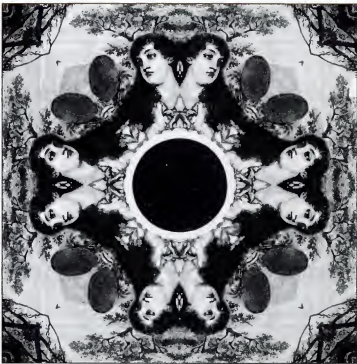
KALEIDOSCOPE:

Beauty Is Only Skin Deep

Judging by appearances, *KALEIDOSCOPE*, DBI Software's new database manager, is impressive, even snazzy: it comes in a plastic snapcase with a hard-bound manual and a set of tutorial booklets liberally sprinkled with screen displays and examples of input dialog. But the packaging is deceptive. Once I dug through this surface layer into the database, I found it came up far short of what I expected.

DBI markets *KALEIDOSCOPE* as "a shining new software concept that is your guiding light to the fourth generation," but I found little in the program to substantiate that claim. To me, the term "fourth generation," a current industry buzzword, means a powerful program with state-of-the-art features and an advanced user interface that permits nonprogrammers to use the package to the fullest. In a database manager, "fourth generation" would mean a free-form, English-like, ad hoc inquiry language of considerable power, a data dictionary to support it, multiple index keys for high-speed access to data, complete full-screen support, and automatic storage of frequently used ad hoc command sequences. Such a system should give the novice user the ability and confidence to push the system to its limits. By these measures, *KALEIDOSCOPE* completely misses the boat.

KALEIDOSCOPE's documentation is as well done as the packaging. Separate tutorial booklets and color-coded disks are enclosed for the major components of the



KALEIDOSCOPE doesn't live up to its billing as a "fourth generation" database manager. The only bright spot in this program is its snazzy packaging.

system: the Editor, DBI Language, Calc-Merge, Data-Merge, and the Systems Designer. Each manual is tastefully typeset, except for the most important one of all—the Editor book, which looks like something out of a grammar school library. The pages of the Editor manual are covered with arrows, handwritten notations in comic balloons, and other useful symbols, including a "STOP" sign and pictures of blackboards, pencils, and chalk. Disregarding the distracting graphics, I discovered it is well written and accurately describes the Editor.

The method of presentation in all of the manuals assumes a low level of computer knowledge. For example, the main manual covers the basics of loading the software, the differences between MS-DOS and CP/M, and the steps required to get from the master disks to a "working" set of disks. On my PC-XT, all that was required was to create a subdirectory and then a COPY A:.* command to transfer each of the masters onto my hard disk.

A brief note in one of the pamphlets reminds you that ANSI.SYS must be installed as a driver before this system will run. Otherwise, *KALEIDOSCOPE*'s initial installation is as simple as they come.

A BASIC Surprise

My first surprise came when the manual reminded me that I had to have BASIC.COM in the working directory. BASIC? Surely a product that bills itself as "fourth generation" doesn't depend on Microsoft's BASIC to get the job done! Alas, it does. I then added BASIC.COM to my subdirectory and forged ahead into the main manual. My next discovery was that you really need a BASIC manual to use *KALEIDOSCOPE*. DBI states that *KALEIDOSCOPE* uses BASIC, and you are instructed to refer to the BASIC man-

ual when you run into trouble.

The main manual includes warranty information and a hot-line phone number in an envelope at the back of the book, but I believe the text would be more reassuring to the novice user if it didn't include phrases such as "the disks or programs will occasionally fail." Another problem for both novice and experienced users is that the manual redefines some terminology that has been around for years. For example, in describing files, the manual

Far from a fourth generation product, KALEIDOSCOPE is not as advanced as dBASE II, the accepted standard for database managers.

misstates the phrase for which ISAM is the acronym. Also, the DBI "Editor" is not an editor at all but rather a command interpreter, which has no text-editing capability. And the DBI "Compiler" does not appear to compile anything—it simply processes BASIC source code, which is then fed directly to BASIC for interpretive execution.

Far from a "fourth generation" product, *KALEIDOSCOPE*, is not even as advanced as *dBASE II*, the accepted industry standard for database managers. For instance, *dBASE II* has been much criticized for its 32 fields and 1,000-byte record limit. *KALEIDOSCOPE* only allows 20 fields and 255 bytes per record. Also, each file must contain a unique, nonrepeating key, and alternate key index files are not automatically maintained and thus must be resorted before use.

Also, the Editor offers a very limited subset of the commands available to a *dBASE II* user. The SEARCH command can use only a single-field comparison; you create temporary files and do it over and over if you need to select on multiple fields. The ADD and CHANGE commands—roughly similar to APPEND and EDIT in *dBASE*—do not use cursor keys or interfield movement. You must indicate the field to be altered by typing its full name or, in the case of an error, you use

the caret key (^) to signal that you wish to back up to the previous field. Scope specification (either a specific record or range of records) is by absolute record number, not by key value. When you do request a record by key value, the system resorts the current index first since index maintenance is not automatic in *KALEIDOSCOPE*.

While the CHANGE command allows for replacement of a field (either character or numeric) and addition or subtraction of numeric fields, addition and subtraction—for a reason that defies logic—are specified by typing "%=" and "%=", respectively, followed by the value to be added or subtracted.

The LIST command displays records (specified by absolute key number) or a single record (specified by index key, after a sort is executed). The normal display looks like the edit mode screen, with the field names in a vertical column at the left and the data content of each field displayed in a matching column to the right. *KALEIDOSCOPE* offers you the option of directing the output to the printer and using a very elementary report writer, called the forms option, which organizes the data in a more conventional format with column headings across the top and the data in multiple columns below. This function does not permit display of literal values, customized column headings, computation, or variable column spacing. I could not find a way to get the system to remember a listing form once I had answered the questions. To repeat the same form later, you must rekey the entire thing. Compared to the listing functions of packages at half the price of *KALEIDOSCOPE*, this LIST command is not impressive.

Moreover, although *KALEIDOSCOPE*'s Editor module processes commands that create files and manipulate data, the actual entry and editing of your pseudo-BASIC program are done using BASIC's line editor, which should have been buried years ago. I don't know anyone who still uses it now that full-screen editing packages are readily available. The DBI Editor's vocabulary contains 16 commands covering record creation and modification, deletion and recovery, sorting, searching, and listing.

The Editor's implementation is clearly



KALEIDOSCOPE, Version 7.1

DBI Software Products
5805 E. Pickard Rd.
Mount Pleasant, MI 48858
(517) 772-5055

List Price: \$695

Requires: 128K RAM, two disk drives.

CIRCLE 687 ON READER SERVICE CARD

rooted in antiquated teletype technology and barely compares to other modern database products.

Once you pass the Editor, you are introduced to the processing language called DATA BASIC. This capability means KALEIDOSCOPE fits into PC's Project: Database Category 3 (see "Project: Database, Part 5," PC, Volume 3 Number 15, for a definition of Category 3 packages), since it makes it programmable.

To write a process routine for KALEIDOSCOPE, you use the primitive line editor of Microsoft's BASIC interpreter. What you do then is write your commands in a language that is made up of 30 macro statements, which are each represented in the output file as a comment line containing a 3-character command. You assign line numbers to each statement, start each line with a single quote, and then terminate the line with a semicolon. Then you enter your program with its KALEIDOSCOPE macros through the DBI compiler, which expands the macros into BASIC source code of considerable volume.

These macro commands lack the power to compete with modern database packages—even those costing much less than KALEIDOSCOPE. For instance, it takes over 40 lines of DATA BASIC code to produce a simple totaled report that dBASE II cranks out without requiring any code at all; it simply asks you to respond to a few simple prompts. Positioning the cursor on KALEIDOSCOPE input screens requires the old 0-1919 numbering scheme. Modern programs let you address the fourth position on screen line 12 as "12,4" or "4,12" instead of as "963."

If you can't get what you want with those macro commands, you can drop all the way into BASIC by using the BAS command, which permits you to perform field tests and branching to a degree that you would not reach in the formal syntax of DBI.

The Utilities section of the manual describes a Screen Generator, which DBI terms "a highly interactive program." What I found was another noninteractive screen form to fill out. No cursor painting here—just a list of field numbers, prompt text, and screen locations (in the old numbering, remember). You identify the data elements by field number (not name) and

KALEIDOSCOPE

- **Manufacturer**
DBI Software Products
One Energy Place
5805 East Pickard Road
Mount Pleasant, MI 48858
(517) 772-5055
- **Price**
\$695.00
- **Category**
3

SYSTEM SPECIFICATIONS

- **Maximum number of record types per database**
Nine at a time
- **Maximum number of fields per record**
20
- **Maximum record size**
255 bytes
- **Maximum number of records per file**
32,767
- **Maximum number of records per database**
294,903
- **Maximum field size**
124 (key field) or 254 (non-key field)

PERFORMANCE MEASUREMENTS

- **Time to enter standard data**
File definitions: 5 minutes/file via editor.
Data records typed in add mode at typing speed. No screen delays.
- **Time to extract a random record**
1 second from small test file of 25 records

- **Time to prepare standard task**
2 minutes
- **Time to execute standard task as indicated on specifications sheet**
1 minute
- **Size of database created**
25 records
- **Space compression used?**
No
- **Variable length of fields supported?**
No
- **Number and size of ancillary files**
3 index "Altkey" files
- **Degradation with additional indexes**
Only handles one index at a time.
- **Time to perform sort as indicated on spec sheet**
< 1 minute
- **Time to create a standard report**
25 minutes
- **Time to execute standard report**
2.5 minutes
- **Minimum hardware/software required**
DOS 2.0, 64K (more for multiple files open at once), two 360K floppy drives, BASIC.COM.
- **Suggested hardware/software configuration**
Same as minimum
- **Hardware/software configuration used in testing**
PC-XT, 512K, DOS 2.1.

can specify that fields should be carried forward. You can not edit or validate the incoming data.

An additional menu gives you access to basic file management functions, such as repacking, structure alterations, and file duplication. These functions should be an integral part of the Editor syntax. Placing them in a separate menu system simply adds extra steps.

KALEIDOSCOPE costs \$695. For that price, you could buy dBASE III, or most of the highly rated database packages reviewed in PC Magazine's "Project: Database," and still have money left over. This

high price may be in line with KALEIDOSCOPE's fancy packaging, but it's out of line, given the quality of the program.

For all the imagery of its name and its glossy wrapping, KALEIDOSCOPE does not embody any shining new concepts and is not a fourth-generation product. It has at least three more generations to go before it will earn that title. ■

Editor's note: At press time we learned that DBI had recently introduced Version 7.2, with faster execution and an improved help facility and user interface.

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COMPUTERS WITH HEART

The Compaq shares credit with the Jarvik-7 heart for the success of William Schroeder's historic artificial heart implant operation.

Ever since William Schroeder made headlines last November as the second person to receive an artificial heart, a Compaq portable computer has been quietly sharing the spotlight. Throughout Schroeder's operation and his recovery, the computer, via an assortment of tubes and wires, has provided doctors with the crucial link to the inner workings of the mechanical heart.

The physicians and technicians involved in this historic operation at the Humana Hospital Audubon in Louisville, Kentucky, admit that the fresh-from-the-box 256K Compaq was as much responsible for the successful implant as the Jarvik-7 heart itself.

The Compaq serves several bedside roles as a peripheral nursemaid to the driver that keeps Schroeder's aluminum and polyurethane heart thumping. But its most important function is as a diagnostic tool. The software used for this application was developed by the manufacturer of the Jarvik-7 heart, Symbion, in Salt Lake City, Utah. It displays a two-axis plot, with the



Physicians attest to the Compaq's contribution to the success of the operation.

lines representing the air exhausted from the right and left chambers of the Jarvik-7 heart. The software records the graphs in real time and dumps them into memory once every 15 minutes; it averages the left and right heart functions every minute.

Symbion's artificial heart project manager, Laurence Bennett, refers to the software program as the "heart's thermometer" and says that the Compaq's primary responsibility is to measure the airflow coming from the heart to determine how much blood actually fills it. The waveform of the airflow also indicates how the valves and heart are performing, whether

or not the valves are closing properly, and at what rate all this is going on.

During the 6½-hour surgery performed by William DeVries, M.D., Humana assistant technical director Brent Mays connected the huge heart-drive console to Schroeder's chest. In that procedure, the Compaq replaced an entire second console that had originally been used by the first mechanical heart recipient, Barney Clark; the console carried an Apple IIe, a hard disk, a

monitor, and a printer.

"When Barney Clark walked around, it was like he was pulling a train of hardware," recalls Bennett, who explains that the Compaq's small size was one of the reasons why the original Apple program was rewritten for an MS-DOS machine.

Symbion decided to transfer the software to an IBM compatible because of the limitations of the Apple. The original program was written in BASIC, and the team of programmers wanted to rewrite it in C language to increase its efficiency and future flexibility. To this day, however, the Apple IIe remains the backup machine

HEART

for the Compaq. In fact, it has performed flawlessly compared to the newer program, which is still being tweaked.

Data Acquisition

The move toward IBM compatibility was a reflection of an overall trend at Symbion. In 1982, Symbion researchers used IBM PCs for the development of an artificial ear and in the CAD/CAM development of this earlier mechanical organ. "Otherwise," Bennett explains, "IBM computers are extensively used for data acquisition in the medical device business these days."

As in all experimental procedures such as heart transplants, the teams have to keep exhaustive notes to satisfy the watchdogs in Washington, D.C., or at the F.D.A. For this reason, the Humana Heart Institute administration went IBM last year and then explicitly purchased an AT for the artificial heart project last fall.

The AT currently sits down the hall from Schroeder's hospital room at a nurse's station and logs in laboratory data records. The researchers specifically designed a database management program for the Schroeder experiment. "You have no idea of all the data we have to collect," Bennett notes. "By the time this experiment becomes a recognized procedure, we'll have books and books of data."



The Compaq serves as a peripheral nursemaid to Schroeder's artificial heart.

To handle the overabundance of data, the scientists at Symbion developed a way to download the information directly from the Compaq to a database management program on the AT. But first, they had to connect the Compaq to a number of Hewlett-Packard (HP) gauges that monitor everything from Schroeder's pulse rate to his blood pressure.

The Compaq's role isn't strictly that of a bean counter. The Symbion programmers built several alarm functions into the Compaq program. The four different alarms automatically inform the nursing

staff of the nature of the emergency before they even get into the room.

Other changes to the system are also in store. The programmers are near completion of a pressure waveform graphic for the pumping cycle. Rather than charting the airflow coming back from the heart, scientists will soon be able to look at the airflow going to the heart. This procedural change is important because it will allow them to monitor the performance of the drive system that is responsible for keeping Schroeder's "tin man ticker" ticking at 70 beats per minute.

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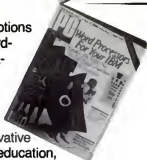
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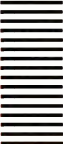
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HEART

And more changes still need to be made. As the heart team makes modifications on the day-to-day performance of the Jarvik-7 heart, the computer programmers are equally eager to modify the peripheral gear. Their overall aim is to make everything smaller because the "mad scientist" equipment in the recovery room has a psychological drain on implant recipients. They believe that once the peripheral monitors become fully portable and unobtrusive, the depression that often occurs with an artificial heart implant will subside.

Schroeder's Case

Schroeder's mood improved drastically after his stroke when he carried an 11-pound portable version of the closet-size driver downstairs for the first time.

An equally important computer advance was made that same day. For use with the portable driver, the technical staff replaced the Compaq with a Sharp TC 1350 hand-held computer, which was programmed by Peter Hiemes, M.D., Aachen, West Germany, who designed the portable pump. Its functions are similar to those of the Compaq, but reduced.

Despite the emphasis on high tech, neither Barney Clark nor William J. Schroeder became hospital hoppers during their recuperation. However, both patients developed "TV screen syndrome," a tendency to watch every heart beat on the computer screen as if their lives depended on such vigilance.

As a result, the computer screen will become less conspicuous in future hardware generations or, at least, it will be hidden. Currently, when the nurses see Schroeder staring at the Compaq display, they turn down the screen brightness.

Even with an overall move toward increased miniaturization, though, Bennett maintains that a Compaq ("or some such computer") will always be involved in the artificial heart implant procedure. "I can see a time in the near future where the patient will be in the hospital for a week or so in post op, and we'll probably still monitor his heart with a device like this," he says. "Even when he's out playing golf and having a good time, he'll still have to go to his doctor to hook into the monitor. Or, perhaps, he may even own the computer himself."

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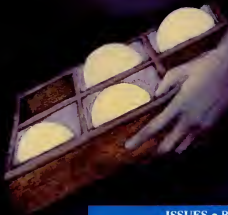
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SOFTWARE PIRACY

estimates that 50 percent of the business software market is lost to pirates. Based on estimates of the current market, that amounts to several billion dollars of lost revenue.

Why is piracy so widespread? Probably because copying software is a simple, almost automatic procedure—in fact, it's one of the first operations new users learn. Experienced computer users consider it

irresponsible *not* to make a copy of a valuable program; you need a back-up copy to ensure that you don't lose your investment if the computer suddenly destroys your program or data.

Some software publishers copy-protect their programs, making it difficult if not impossible to copy them. But these publishers alienate customers, who consider back-up copies a critical element of proper computer use.

Unlawful copying and distribution of computer programs has been steadily robbing the economy of what may add up to billions of dollars.

"Copying is the first thing you should do with any of your programs," says a West Coast journalist who covers computers. "And the act of stealing is the same as the act of copying. If copying were more difficult, it might be less common. But the act is so simple."

It is also illegal, according to software publishers. When you buy personal computer software, you receive a license to use the program on only one computer. If you own two PCs, you're supposed to buy two copies of the program. "But I don't think the fine print on the disks or in the manuals is stopping people," says the journalist.

"It's as easy to copy software as to copy a cassette," he continues. "But there's a greater ethical sense involved." It's precisely the ethical issues however that many pirates do not recognize. One New England mathematician recently rejected a "tainted" research grant from the Air Force, but he actively encourages his colleagues to trade software with him.

The Size of the Problem

"Wholesale copying for profit is not a problem," says Dr. Edward H. Currie, president and CEO of Lifeboat Associates, one of the largest publishers of microcomputer software. Currie thinks that the piracy issue has been blown far out of proportion. "Copying exists as a noise level," he says.

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Currie attributes the piracy that does exist to newcomers in the personal computer world. They don't understand the difference between having just a physical copy of a program and having the manuals

and customer support that publishers provide to their legitimate customers.

The problem does, however, extend to larger companies. In one highly publicized case, Lotus Development Corporation

sued Rixon, Inc., for \$10 million for actively copying and distributing copies of Lotus's 1-2-3 to branch offices. Rixon settled out of court. More recently, Lotus sued a Nashville, Tennessee, company for \$1 million.

Jerry Dreyer, president of ADAPSO, says that companies that purchase 10 or 20 PCs often don't budget for an equal number of copies of software. Though corporate policies never actually condone piracy Dreyer feels that without strong corporate statements against piracy, many managers may not think about the effects of their actions.

By Dreyer's standards, the way the impersonal business world deals with software isn't unethical; it's neutral. But others fear that managers in the middle-level departments where piracy is apparently most common—the leaders of the next generation—are being conditioned to believe that thievery is acceptable.

Illegal or Not?

Some people don't consider small-scale copying illegal. "Just because the license says I can't use it on two machines doesn't mean that's enforceable," says Howard Stevenson, a professor at the Harvard Business School. "Suppose I typed at the bottom of a letter, 'By reading this letter, you agree not to sue me.' That's not enforceable."

"Just because the license says I can't use software on two machines doesn't mean that's enforceable," says Howard Stevenson, a professor at the Harvard Business School.

The Health Group, the Tennessee firm sued by Lotus, echoed Stevenson's words in a public statement, arguing that contracts imposed unilaterally are not legally valid.

Others, even some large software companies, argue that although piracy may be illegal, it is not worth worrying about.

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SOFTWARE PIRACY

"We have a wait-and-see attitude," says a spokesman for Microsoft, one of the major publishers of software for the PC.

Ric Giardina, general counsel to MicroPro International, which developed the popular word processing program *WordStar*, says he wouldn't prosecute an individual user. "I wouldn't want to get into the big-bully role," he says. "It's the guy who knowingly rips us off for profit that I'm after."

"I have my own standard that doesn't allow me to copy software, but it's not for me to judge other people," says Ric Giardina, general counsel to MicroPro International.

Giardina views the subject as a matter of ethics. "I have my own standard that doesn't allow me to copy software, but it's not for me to judge other people." Some people, he notes, copy phonograph records onto cassettes for use in their cars. That doesn't bother him personally, he says, but "a record company would be incensed."

Indeed, people often compare software piracy to photocopying, cassette taping, and home videotape recording. ADAPSO's Dreyer, obviously a strong opponent of software piracy, acknowledges that he'll photocopy an article even though it is illegal to do so. He hasn't been conditioned to think of photocopying as illegal, he says, and he thinks people treat software copying in the same way. "They're thinking about saving money, not about whether it's wrong," he says.

"Perhaps a good analogy is the speed limit," says Thomas Dunfee, a professor of social responsibility at Wharton Business School. "Fifty-five is legal, 65 everyone accepts, but at 75 you get stopped. Custom develops into an implied rule, modifying the express rule." Dunfee considers legality a relative issue that depends on the habits and practices of society.

The Human Cost

A Washington, D.C.-based computer consultant who can make a copy of virtually any program available talks about how he helps people look for new software.

"People want to evaluate a program before they buy it. That's reasonable, and I'll help them. But if they don't intend to buy a copy of the program they choose to use, I won't give it to them. After all, I

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SOFTWARE PIRACY

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Programmers absorb much of the cost of piracy. Every illegal copy of a program takes royalties away from the programmer who wrote it. "Most program authors are

industrious; they're struggling to make it" says Edward Currie. "It's sad that these people are being denied their due compensation."

But pirates don't think about the

author. To them, the system seems inequitable. Most people who copy software illegally actually think *they* are the ones being ripped off. "None of the software is worth what we're paying for it," David Alpert told *Esquire* in 1982. Alpert is the developer of a program called *Locksmith* that lets users copy any program, even one that is copy protected. "Software should

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"Most program authors are industrious; they're struggling to make it," says Edward Currie. "It's sad that these people are being denied their due compensation."

be subsidized by larger distribution," he said. "But the market doesn't exist yet, so we're paying by being pioneers."

Harvard's Stevenson agrees that justice may be on the side of the pirate. "Why am I being charged \$600," he asks, "for something which costs \$13?"

The lines have been drawn in the battle over ethics. On one side are the programmers and their colleagues, entrepreneurs who use their wits, talents, and educations to build businesses. On the other side are customers who object to an industry that is trying to make a buck as fast as it can. In such an atmosphere, *ethics* becomes almost synonymous with *utility*. "It's like bartering with a car dealer," says the West Coast journalist. "Why pay more for something you can get cheaper?"

Dunfee turns that argument around, associating the utility of ethics with economics. "Piracy destroys the economic system," he says. "It makes the system less efficient. Honesty is more efficient."

Ultimately, then, ethics and utility combine. We base our ethical decisions not on any great moral ideals but on dollars and cents. For those who side with honesty and software publishers, is there any hope?

Perhaps there is. The creator of one new idea has specifically labeled it a step

SOFTWARE PIRACY

toward a new economics, taking into account the universal desire to get expensive products cheaply. Andrew Fluegelman, the author of the popular communications program *PC-Talk*, has rejected the traditional marketing routes. "The cost of reproducing information is minuscule compared to the cost of production," he points out. "And anyway, even the best copy protection will be cracked within 15 minutes by some 15-year-old kid in San Jose."

Freeware

A fund-raising drive on public television inspired Fluegelman to try an experiment which he called "freeware." Basically, he trusts you. He allows unlimited copying of *PC-Talk III* and encourages people to give it to their friends. All he asks is that if you find *PC-Talk III* useful, you send him \$35.

In return for this comparatively small fee, Fluegelman will send you a new copy of the software (to ensure that you have the most up-to-date version) and will put you on a mailing list to notify you of future updates.

Jim Button uses the same system to distribute his ButtonWare line of software, which includes *PC-File*, *PC-Type*, and *PC-Graph*. He describes his programs as "user-supported software", by which he means that users support him both with financial payments and suggestions for improvements in his programs. Button is more strict than Fluegelman about payment, requesting that people who choose

"Even the best copy protection will be cracked within 15 minutes by some 15-year old kid in San Jose," says Andrew Fluegelman.

not to pay also stop using the software. But, he acknowledges, "We thrive on people copying our programs."

Button estimates that only about 10 percent of the people who have ever used his most popular program, *PC File*, have paid for it. But with 60,000 copies circulating,

he has enough income to hire full-time employees.

Perhaps Fluegelman and Button are right in trying a new approach to economics for the electronic age. Perhaps the tech-

nicians are right in believing that eventually a new technical fix will make copying software so difficult that piracy will die out. Most likely, the truth lies somewhere in between. ■

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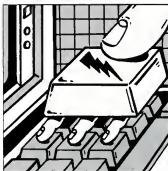
Type F5 Alt Esc A n. If that's the kind of command sequence your PurpleProse word processor requires in order to shift the cursor n spaces to the right, or if you're just plain tired of entering long, repetitious strings of commands in 1-2-3 or dBASE, then ONEKEY.COM is the program for you.

As its name suggests, ONEKEY condenses intricate and frequently used commands into just one key. It can be used at any time, with any program I've tried, so all you have to do is enter either the BASIC (Figure 1) or the assembler (Figure 2) version, and you'll be ready to start simplifying your life. [The program is also available via modem from the PC Interactive Reader System, whose telephone number is (212) 696-0360.—Ed.]

Admittedly, keyboard entry is no small task, but despite its size, the ONEKEY code was written as compactly as I could manage. All the numbers you see in the data statements of the BASIC version are the decimal equivalents of the binary machine code that actually makes up ONEKEY.COM.

ONEKEY, of course, needs to know just what command sequences are being replaced by which keys. Thus, the BASIC program in Figure 1 asks you, command by command, first for the "trigger" key you want to use hereafter for a given command and then for the keystroke sequence to be replaced by that key. You could, for example, use function key F10 to execute the following commands:

1985/No. 9



```
COPY B:*.OLD A:*.BAS<cr>
DIR B:*.BAS<cr>
```

Make sure to include all carriage returns and control characters when you're typing the commands in, since ONEKEY can only supply the keystrokes you have given it. For instance, if you wanted 'N to start your favorite PC game, *Star Peril*, you might use it to replace:

```
B:BASIC STRPERIL<cr>
```

ONEKEY can accept a total of 30 new trigger keys, each of which can replace up to 50 characters.

The manuals for DOS versions 2.0 and 2.10 indicate that, under DOS itself, you can reassign entire strings to a single key,

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PROGRAMMING

which certainly sounds like what ONEKEY does. Under the promising title of "Keyboard Key Reassignment," IBM suggests that if your program prints out the command

```
ESC [0;60;"dir";13p
```

(a command that would be very much at home in the *PurpleProse* manual), it will instruct DOS to reassign the F10 key to the string `dir<carriage return>`. The IBM approach does work, of course, and these reassignments can be very useful. The trouble with them, however, is that only DOS's definition of the F10 key is changed. If your program, after it's been compiled, uses DOS to read the characters from the keyboard, then all is well: every time F10 is struck, DOS will obediently inform your program that `dir<cr>` has

been typed.

Unfortunately, however, DOS's promise is an empty one; many programs do not use DOS to read what you've typed. Indeed, almost no word processors do. Nor will the DOS reassignment work for 1-2-3 or dBASE. It is routine today instead to use the BIOS services to read characters from the keyboard, and the BIOS is immutably set in ROM and not open to key reassignments.

A number of intrepid programs even go so far as to read character input directly from the keyboard buffer, in low memory. This is the lowest level at which a character can be read, so if ONEKEY is to be all-purpose, here is where it must operate. This buffer is what the BIOS or DOS reads, and by working here we'll get to what's been typed before either of them.

Locking Up the Keystrokes

While most readers will find it far easier to enter the ONEKEY.BAS listing (Figure 1), let BASIC ask them for the key-command substitutions, and turn the entire program into ONEKEY.COM automatically, inveterate assembly language buffs will prefer their customary approach. If you simply type in the listing of ONEKEY.ASM (Figure 2) and assemble it, however, you'll produce a ONEKEY.COM file with no keys substituted for any command strings. This sidebar will explain how to insert the desired characters into the .ASM file.

Entering Characters in ONEKEY.ASM

If you're rugged enough to want to put your own characters into the assembler version of ONEKEY, the first things you need to determine are the proper scan and ASCII key codes to enter. The easiest way to do this is with the very short BASIC program listed below.

```
10 FOR I=1 TO 10:KEY I,"";NEXT I
20 DEF SEG = 6400
30 FKEYS=INKEY$:IF FKEYS="" GOTO 30
40 TAIL=PEEK(26):TAIL=TAIL-2:IF TAIL < 30 THEN TAIL = 60
50 CODE1=PEEK(TAIL):CODE2=PEEK(TAIL+1)
60 PRINT HEX$(CODE1) SPC(1) HEX$(CODE2) SPC(2);:GOTO 20:END
```

By way of example, suppose you want to replace F9 with `DIR<cr>` and F10 with `DIR B:<cr>`. To find the scan and ASCII codes for these characters, run the BASIC program and type F9. These numbers should appear: 0 43.

Together, these two hex numbers make up the hex word 4300H, since the PC stores the two bytes of a word with the lower byte first. Thus, the number corresponding to F9 is 4300H, which you'll be putting into ONEKEY.ASM.

Next, type the command this key will replace. The BASIC program gives us this:

```
44 20 49 17 52 13 D 1C
10 1 1 1 R 1 <cr>
```

`DIR<cr>` thus yields the words, 2044H, 1749H, 1352H, and 1C0DH. Sim-

The Keyboard Buffer

Whenever you strike a key on the PC, a signal is sent directly to the 8088, indicating that fact. This particular signal—called interrupt 9—does as its name suggests and interrupts the PC to read the character you've typed.

When the keyboard sends an interrupt to the PC, the PC does not have to stop instantly. It might instead temporarily disregard the interrupt if it is in the middle of something critical. (This is why Control-C and Control-Alt-Del don't always work.) When it can take the interrupt, however, the PC executes its special keyboard interrupt subroutine, which is located in ROM.

The number generated from the keyboard is, as you might expect, different for every key. This number is quickly interpreted,

and the apposite code for that key is put into the keyboard buffer.

The keyboard buffer consists of a group of 16 words in memory. One of these positions holds the next character that will be read from the buffer and is called the "head." Correspondingly, the "tail" is the position where the next character written will be placed. When you type a character, the tail advances. When the PC reads one, so does the head. Since both the head and the tail wrap around when they come to the end of the buffer, the whole buffer is most usefully thought of as a ring of 16 words, and it presents the rather picturesque image of an eager head forever chasing its reluctant tail.

When the head catches the tail and the two are at the same position, the buffer is empty. If the tail comes up from behind

and overlaps the head, it means that the buffer is full—and you'll get beeped.

ONEKEY

ONEKEY intercepts the keyboard interrupt subroutine right before the BIOS read routine has placed the character into the keyboard buffer. ONEKEY immediately reads that character and consults the little table of keys you've supplied, to determine whether or not it should spring into action.

If it recognizes a key, 'N, for example, it puts your corresponding command, B:BASICA STRPERIL<cr>, into the keyboard buffer. Before doing so, however, it must first erase the actually typed key ('N) from the buffer. It does this simply by moving the tail (which advances for each new character) back one space. ONEKEY then systematically loads letter after letter of the command (B:BASICA STRPERIL<cr>) into the waiting keyboard buffer.

If you've been counting, however, you will have noticed that this exemplary command is 18 characters long, and you'll remember that IBM has blessed us with a keyboard buffer that is only 16 characters in length. That means that we will not be able to stuff the entire command into the buffer at one go but must wait to finish until some of the letters have been read from it. In order to do this we make use of a second hardware interrupt in the PC: the timer interrupt.

The Timer Interrupt

Among the PC's small army of chips, there is one more rhythmic than most, and it sends out a regular pulse 18.2 times a second. This timer is used to interrupt the PC at that same rate. It may come as news to many readers to learn that 18.2 times every second the PC stops whatever it is doing and executes a timer interrupt. Every program that you run, unless it makes special arrangements, is interrupted this way while the PC updates the internal time of day and checks to see if the date has changed. This interrupt—number 28—is issued every .0549254 seconds, which may seem an oddly chosen interval until you realize that it works out to precisely 65,536 or 2^{16} counts per hour. This

ilarly, F10's numbers become 0 44 (4400H), and the DIR B:<cr> string to be replaced is:

```
44 28 49 17 52 13 28 39 42 38 3A 27 D 1C
|_D_| |_I_| |_R_| |_B_| |_A_| |_S_| |_C_|
|_D_| |_I_| |_R_| |_B_| |_A_| |_S_| |_C_|
```

These become the words 2044H, 1749H, 1352H, 3920H, 3042H, 273AH, 1C0DH, which you will pack into the .ASM code. The keys go in order into the little bank named KEYS. There are 30 words in KEYS to allow for 30 commands, and this total must be kept at 30. Thus, starting from

```
KEYS DW 30 DUP(0)
```

you put in your two, 4300H and 4400H, leaving 28 DUP(0). Thus, the .ASM line becomes:

```
KEYS DW 4300H,4400H,28 DUP(0)
```

Entering the COMMAND definitions is only slightly more difficult. Each command is given exactly 51 words (50 words of command and at least one word of 0 to serve as an end mark). To preserve this, you give the first command, DIR<cr>, 4 words of characters (as above), and 47 words (equals 51 total) of 0s, thus:

```
COMMANDS DW 2044H,1749H,1352H,1C0DH,47 DUP(0)
```

From there you add the next command, which is also allocated a total of 51 words. Thus, while the old COMMANDS line read simply

```
COMMANDS DW 1530 Dup(0) ;
```

using the examples above, the new COMMANDS area of ONEKEY would become:

```
COMMANDS DW 2044H,1749H,1352H,1C0DH,47 DUP(0)
           DW 2844H,1749H,1352H,3920H,3042H,273AH,1C0DH,44 DUP(0)
           DW 1428 DUP(0) ;1428 = 1530-2*(51)
```

All that remains to be done is to run ONEKEY.ASM through MASM, LINK, and EXE2BIN. It's easy to make a mistake this way, though, and if you do, you might use the BASIC program and leave the driving to it.—S.H.

PROGRAMMING

allows the PC to calculate the hours that have passed with exceptional ease.

ONEKEY's Second Half

Therefore, when we first tried to stuff the buffer and didn't quite finish, ONEKEY made a note of the fact in memory and saved its place in the command string

that was being fed into the keyboard buffer. The second half of ONEKEY intercepts the timer interrupt, and so 18.2 times a second it checks to see if we can pack the remaining characters into the buffer. When space is available, it takes up exactly where it left off and blithely finishes the job for us, the perfect stenographer.

To the eye the process looks quite continuous, and 5 characters appear on the screen as smoothly as 50. Since we've now packed our command into the most fundamental link of the input chain, any program, DOS or BIOS included, will read what we have told it. Even *Purple-Prose*. ■

```

10 DIM KEYS(60), COMMANDS(30,102)
20 FOR I=1 TO 10:KEY I,"":NEXT I:CLS:KINDEX=1:CINDEX=1
200 FOR I=1 TO 30
220 LOCATE 10,15:PRINT"          Type the single, trigger key."
230 LOCATE 11,15:PRINT"(Use Control End if there are no more keys)."

```

(continues)

Figure 1: A BASIC program to create ONEKEY.COM.

PROGRAMMING

(Figure 1 continues)

```

2060 DATA 0, 142, 216, 139, 30, 28, 0, 59, 38, 26
2070 DATA 0, 117, 3, 233, 140, 0, 131, 235, 2, 131
2080 DATA 251, 30, 115, 6, 187, 62, 0, 131, 235, 2
2090 DATA 139, 7, 46, 128, 62, 82, 1, 116, 3
2100 DATA 235, 114, 144, 46, 198, 6, 82, 1, 46
2110 DATA 141, 54, 22, 1, 185, 30, 0, 46, 59, 4
2120 DATA 116, 8, 131, 190, 2, 226, 246, 235, 87, 144
2130 DATA 250, 46, 141, 54, 83, 1, 247, 217, 131, 193
2140 DATA 30, 139, 193, 185, 102, 0, 246, 225, 3, 240
2150 DATA 46, 137, 54, 71, 13, 46, 139, 4, 131, 198
2160 DATA 2, 61, 0, 0, 116, 50, 139, 211, 131, 194
2170 DATA 2, 131, 250, 62, 124, 3, 186, 30, 0, 59
2180 DATA 22, 26, 0, 116, 25, 46, 131, 6, 71, 13
2190 DATA 2, 137, 7, 131, 195, 2, 131, 251, 62, 124
2200 DATA 3, 187, 30, 0, 137, 30, 28, 0, 235, 201
2210 DATA 46, 198, 6, 82, 1, 0, 88, 91, 89, 90
2220 DATA 95, 94, 31, 251, 207, 156, 30, 14, 31, 255
2230 DATA 30, 77, 13, 156, 120, 62, 82, 1, 1, 116
2240 DATA 95, 250, 30, 86, 82, 83, 80, 184, 64, 0
2250 DATA 142, 216, 139, 30, 28, 0, 46, 198, 6, 82
2260 DATA 1, 1, 46, 139, 54, 71, 13, 46, 139, 4
2270 DATA 131, 198, 2, 61, 0, 0, 117, 3, 235, 51
2280 DATA 144, 139, 211, 131, 194, 2, 131, 250, 62, 124
2290 DATA 3, 186, 30, 0, 59, 22, 26, 0, 116, 25
2300 DATA 46, 131, 6, 71, 13, 2, 137, 7, 131, 195
2310 DATA 2, 131, 251, 62, 124, 3, 187, 30, 0, 137
2320 DATA 30, 28, 0, 235, 198, 46, 198, 6, 82, 1
2330 DATA 0, 88, 91, 90, 94, 31, 157, 31, 207, 30
2340 DATA 184, 0, 0, 142, 216, 250, 161, 36, 0, 46
2350 DATA 163, 73, 13, 161, 30, 0, 46, 163, 75, 13
2360 DATA 199, 6, 36, 0, 81, 13, 140, 14, 30, 0
2370 DATA 161, 112, 0, 46, 163, 77, 13, 161, 114, 0
2380 DATA 46, 163, 79, 13, 199, 6, 112, 0, 5, 14
2390 DATA 140, 14, 114, 0, 251, 184, 64, 0, 142, 216
2400 DATA 187, 30, 0, 137, 30, 26, 0, 137, 30, 28
2410 DATA 0, 186, 119, 14, 205, 39

```

(Figure 1 ends)

```

VECTORS SEGMENT AT 0H ;Set up segment to intercept Interrupts
    ORG 9H*4 ;The keyboard Interrupt
KEYBOARD_INT_VECTOR LABEL DWORD
    ORG 1CH*4 ;Timer Interrupt
TIMER_VECTOR LABEL DWORD
VECTORS ENDS

ROM_BIOS_DATA SEGMENT AT 40H ;The ROM BIOS data area in low memory
    ORG 1AH ;This is where the keyboard buffer is.
ROM_BUFFER_HEAD DW ? ;The position of the buffer's head
ROM_BUFFER_TAIL DW ? ;And tail.
KB_BUFFER DW 16 DUP (?) ;Reserve space for the buffer itself
KB_BUFFER_END LABEL WORD ;Buffer's end is stored here.
ROM_BIOS_DATA ENDS

CODE_SEG SEGMENT ;Begin the Code segment holding the programs
    ASSUME CS:CODE_SEG
    ORG 100H ;Com files start at ORG 100H
BEGIN: JMP INIT_VECTORS ;Skip over data area

COPY_RIGHT DB ' (C) 1984 S. Holzner' ;The Author's signature

```

(continues)

Figure 2: Assembler listing for ONEKEY.COM. See the sidebar for instructions on inserting the codes for KEYS and COMMANDS.

PROGRAMMING

(Figure 2 continues)

```

KEYS                DW      30 DUP(0)           ;The keys we replace
                                           ; See Box at end of article
FINISHED_FLAG       DB      1                   ;If not finished, timer will stuff buffer
COMMANDS            DW      1530 DUP(0)         ;Scan and ASCII codes of commands
                                           ;See Box at end of article
COMMAND_INDEX       DW      1                   ;Stores position in command (for timer)
ROM_KEYBOARD_INT    DD      1                   ;Called to interpret keyboard signals
ROM_TIMER           DD      1                   ;The Timer interrupt's address

INTERCEPT_KEYBOARD_INT PROC NEAR ;Here it is.
    ASSUME DS:NOTHING ;Free DS
    PUSH DS           ;Save all used registers
    PUSH SI
    PUSH DI
    PUSH DX
    PUSH CX
    PUSH BX
    PUSH AX
    PUSHF             ;Pushf for Keyboard Int's IRET
    CALL ROM_KEYBOARD_INT ;Have new key put into keyboard buffer
    ASSUME DS:ROM_BIOS_DATA ;Set up to point at keyboard buffer.
    MOV AX,ROM_BIOS_DATA
    MOV DS,AX

    MOV BX,ROM_BUFFER_TAIL ;Was there a character? If Tail equals
    CMP BX,ROM_BUFFER_HEAD ; Head then no real character typed.
    JNE NEWCHAR
    JMP NO_NEW_CHARACTERS ;Jump out, no new characters.
NEWCHAR: SUB BX,2 ;Move back two bytes from tail;
    CMP BX,OFFSET KB_BUFFER ;Do we have to wrap?
    JAE NO_WRAP ;No
    MOV BX,OFFSET KB_BUFFER_END ;Wrap by moving two bytes
    SUB BX,2 ; before buffer end.
NO_WRAP: MOV AX,[BX] ;Get the character into AX

    CMP FINISHED_FLAG,1 ;Done stuffing the buffer with last command?
    JE FIN ;Yes, proceed
    JMP NO_NEW_CHARACTERS ;No, leave.

FIN: MOV FINISHED_FLAG,1 ;Assume we'll finish

    LEA SI,KEYS ;Point source index at keys to replace
    MOV CX,30 ;Loop over all of them
LOOPER: CMP AX,CS:[SI] ;Match to given key (in AX)?
    JE FOUND ;Yes, key found, continue on.
    ADD SI,2 ;Point to next key to check it.
    LOOP LOOPER ;Go back for next one.
    JMP NO_NEW_CHARACTERS ;Loop finished without match - leave.

FOUND: CLI ;Turn off hardware (timer, keyboard) Interrupts
    LEA SI,COMMANDS ;Set up to read command
    NEG CX ;Find the location of first word of command
    ADD CX,30
    MOV AX,CX
    MOV CX,102
    CL
    ADD SI,AX
    MOV COMMAND_INDEX,SI ;And move it into Command_Index

STUFF: MOV AX,CS:[SI] ;Here we go - get ready to stuff word in buffer.
    ADD SI,2 ;Point to the command's next character

```

(continues)

PROGRAMMING

(Figure 2 continues)

```

CMP      AX,0                ;Is it a zero? (End of command)
JE       NO_NEW_CHARACTERS   ;Yes, leave with Finished_Flag=1
MOV      DX,BX              ;Find position in buffer from BX
ADD      DX,2               ;Move to next position for this word
CMP      DX,OFFSET KB_BUFFER_END ;Are we past the end?
JL       NO_WRAP2          ;No, don't wrap
MOV      DX,OFFSET KB_BUFFER ;Wrap

NO_WRAP2: CMP      DX,ROM_BUFFER_HEAD ;Buffer full but not yet done?
JE       BUFFER_FULL        ;Time to leave, set Finished_Flag=0.
ADD      COMMAND_INDEX,2    ;Move to next word in command
MOV      [BX],AX            ;Put it into the buffer right here.
ADD      BX,2               ;Point to next space in buffer
CMP      BX,OFFSET KB_BUFFER_END ;Wrap here?
JL       NO_WRAP3          ;No, readjust buffer tail
MOV      BX,OFFSET KB_BUFFER ;Yes, wrap

NO_WRAP3: MOV      ROM_BUFFER_TAIL,BX ;Reset buffer tail
JMP      STUFF              ;Back to stuff in another character.

BUFFER_FULL: MOV      FINISHED_FLAG,0 ;If buffer is full, let timer take over
; by setting Finished_Flag to 0.

NO_NEW_CHARACTERS:
POP      AX                ;Restore everything before departure.
POP      BX
POP      CX
POP      DX
POP      DI
POP      SI
POP      DS
STI
IRET

INTERCEPT_KEYBOARD_INT ENDP ;An interrupt deserves an IRET
ASSUME DS:CODE_SEG

INTERCEPT_TIMER PROC NEAR
PUSHF
PUSH     DS
PUSH     CS
POP      DS
CALL     ROM_TIMER
PUSHF
CMP      FINISHED_FLAG,1
JE       OUT
CLI
PUSH     DS
PUSH     SI
PUSH     DX
PUSH     BX
PUSH     AX
ASSUME DS:ROM_BIOS_DATA
MOV      AX,ROM_BIOS_DATA
MOV      DS,AX
MOV      BX,ROM_BUFFER_TAIL
MOV      FINISHED_FLAG,1
MOV      SI,COMMAND_INDEX

STUFF2: MOV      AX,CS:[SI]
ADD      SI,2
CMP      AX,0
JNE      OVER
JMP      NO_NEW_CHARACTERS2

```

(continues)

(Figure 2 continues)

```

OVER:  MOV     DX,BX                ;Find position in buffer from BX
      ADD     DX,2                ;Move to next position for this word
      CMP     DX,OFFSET KB_BUFFER_END ;Are we past the end?
      JL      NO_WRAP4           ;No, don't wrap
      MOV     DX,OFFSET KB_BUFFER ;Do the Wrap rap.

NO_WRAP4:
      CMP     DX,ROM_BUFFER_HEAD   ;Buffer full but not yet done?
      JE      BUFFER_FULL2        ;Time to leave, come back later.
      ADD     COMMAND_INDEX,2      ;Point to next word of command.
      MOV     [BX],AX              ;Put into buffer
      ADD     BX,2                ;Point to next space in buffer
      CMP     BX,OFFSET KB_BUFFER_END ;Wrap here?
      JL      NO_WRAP5           ;No, readjust buffer tail
      MOV     BX,OFFSET KB_BUFFER ;Yes, wrap

NO_WRAP5:
      MOV     ROM_BUFFER_TAIL,BX   ;Reset buffer tail
      JMP     STUFF2              ;Back to stuff in another character

BUFFER_FULL2:
      MOV     FINISHED_FLAG,0     ;Set flag to not-done-yet.

NO_NEW_CHARACTERS2:
      POP     AX                  ;Restore these.
      POP     BX
      POP     DX
      POP     SI
      POP     DS

OUT:   POPF    DS                  ;And Exit.
      POP     DS
      IRET                       ;With customary IRET

INTERCEPT_TIMER  ENDP

INIT_VECTORS  PROC  NEAR          ;Rest Interrupt vectors here
      ASSUME DS:VECTORS
      PUSH   DS
      MOV    AX,VECTORS
      MOV    DS,AX
      CLI    ;Don't allow interrupts
      MOV    AX,KEYBOARD_INT_VECTOR ;Get and store old interrupt address
      MOV    ROM_KEYBOARD_INT,AX
      MOV    AX,KEYBOARD_INT_VECTOR[2]
      MOV    ROM_KEYBOARD_INT[2],AX

      MOV    KEYBOARD_INT_VECTOR,OFFSET INTERCEPT_KEYBOARD_INT
      MOV    KEYBOARD_INT_VECTOR[2],CS ;And put ours in place.
      MOV    AX,TIMER_VECTOR
      MOV    ROM_TIMER,AX ;Now same for timer
      MOV    AX,TIMER_VECTOR[2]
      MOV    ROM_TIMER[2],AX

      MOV    TIMER_VECTOR,OFFSET INTERCEPT_TIMER
      MOV    TIMER_VECTOR[2],CS ;And intercept that too.
      STI
      ASSUME DS:ROM_BIOS_DATA
      MOV    AX,ROM_BIOS_DATA
      MOV    DS,AX
      MOV    BX,OFFSET KB_BUFFER ;Clear the keyboard buffer.
      MOV    ROM_BUFFER_HEAD,BX
      MOV    ROM_BUFFER_TAIL,BX
      MOV    DX,OFFSET INIT_VECTORS ;Prepare to attach in memory
      INT    27H ;And do so.
INIT_VECTORS  ENDP
CODE_SEG     ENDS
END          BEGIN ;End Begin so that we jump there first.

```

(Figure 2 ends)

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Compaq Pluses

Compaq has made several unheralded advances on its motherboard: one for using all 640K and a hard disk, the other for using 256K chips.

The Compaq Revision C ROM uses



two chips to add intelligence. While Revision B restricted memory to 544K, Revision C allows 640K. And Revision C can figure out how much memory you have in the system whether it is on the motherboard or on expansion boards or both. This is accomplished by setting all switches on switch bank #2 in the off position. The ROM reads all contiguous memory available. Revision C ROM is also needed for hard disk operation.

There is a PAL (Program Array Logic) chip on the Compaq motherboard that addresses the four rows of 64K memory. Two rows are soldered in. The other two rows are socketed. These two socketed

rows will accept 256K chips. If you replace these two rows of Compaq-standard 64K chips with 256K chips and replace the PAL chip with one available from Compaq (for \$34.50), you will have a 640K motherboard.

There are two advantages to this approach to memory expansion: the space in the machine is used efficiently for memory expansion, and the 256K chips require almost the same amount of power as 64K chips. The Compaq's power supply has been known to be troublesome when power hungry options are added (such as hard disk, modem, and memory).

David Orme
Western Springs, Illinois

These two changes are welcome. IBM's new generations of computers, starting with its PC AT, calculate how much memory is in the system without requiring dip switches to be set. And they push memory to the limit. The extra 96K above 544K sure comes in handy if you're manipulating giant chunks of data or setting up virtual disks.

Super File FINDER

I've read with much interest the various methods suggested in this column on how to find a file in a directory. Most suggestions involve using a batch file, a BASIC program, and a DOS utility such as TREE or CHKDSK. The WHERE.BAS BASIC program in Figure 1 will create a file called WHERE.COM that will do the trick much faster. One you've run WHERE.BAS and

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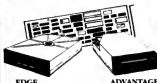
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USER-TO-USER

created WHERE.COM, to find a file merely enter the following at the DOS prompt:

WHERE [drive:] [filename.ext]

WHERE.COM will find all filenames on the specified drive regardless of the subdirectory (if no drive is specified, the default drive is used) whose name matches the specification (if no name is specified, "*" is used).

Kiyoski Akima
Boulder, Colorado

This works extremely well and far more quickly than the batch file techniques mentioned earlier. Although users will have to type in a ton of DATA statements, it's worth the effort. The only problem is that if WHERE.COM finds too many matches, it will start scrolling them off the top of the screen. The two obvious solutions here are to add a "I MORE" at the end of the command, or a "> MATCHES". The first will pause the screen when it fills; the second will redirect the matches into a file called MATCHES. If you try this, put it in

```
100 ' WHERE.BAS -- by Kiyoski Akima
110 FOR I=1 TO 418
120 READ J$
130 TOTALI=TOTALI+VAL("&B"+J$)
140 NEXT I$
150 IF TOTALI=369501 THEN RESTORE:GOTO 170
160 PRINT "Check your DATA statements!":END
170 OPEN "WHERE.COM" AS #1 LEN=1
180 FIELD #1,1 AS C$
190 FOR I=1 TO 418
200 READ J$
210 LET C$=CHR$(VAL("&H"+J$))
220 PUT #1,I$
230 NEXT I$
240 CLOSE #1
250 PRINT "WHERE.COM CREATED":END
260 DATA PC, BF, 79, 02, BE, 81, 00, AC
270 DATA 3C, 0D, 74, 1E, 3C, 20, 76, F7
280 DATA 80, 3E, 5C, 00, 00, 74, 06, AC
290 DATA AC, 3C, 20, 76, 06, AA, AC, 3C
300 DATA 20, 77, FA, A0, 5C, 00, 8A, C0
310 DATA 75, 06, B4, 19, CD, 21, FE, C0
320 DATA 00, 06, 27, 02, BA, 76, 02, BB
330 DATA 2A, 02, E8, 16, 00, 80, 3E, 86
340 DATA 02, FF, 75, 0D, BB, 02, 00, B9
350 DATA 1A, 00, B4, 40, BA, 87, 02, CD
360 DATA 21, CD, 20, 52, BE, 79, 02, E8
370 DATA 86, 00, 33, C9, E8, 60, 00, 72
380 DATA 0D, E8, 85, 00, E8, 6D, 00, 72
390 DATA 05, E8, 7D, 00, EB, F6, 5A, 52
400 DATA BE, 23, 02, E8, 6A, 00, B9, 10
410 DATA 00, E8, 43, 00, 72, 3F, 8B, F2
420 DATA F6, 44, 15, 10, 75, 0D, E8, 4B
430 DATA 00, 72, 32, 8B, F2, F6, 44, 15
440 DATA 10, 74, F3, 08, 7C, 1E, 2E, 74
450 DATA ED, 57, 53, 8B, F2, C3, C6, 1E
460 DATA 8B, FB, AC, AA, 0A, C8, 75, PA
470 DATA 8B, DF, AA, C6, 47, FF, 5C, E8
480 DATA A1, FF, 5B, 5F, C6, 07, 00, B4
490 DATA 1A, CD, 21, EB, C9, 5A, C3, 51
500 DATA 83, C2, 2C, B4, 1A, CD, 21, 8B
510 DATA EA, B4, 4E, BA, 27, 02, CD, 21
520 DATA 8B, D5, 59, C3, 8B, EA, B4, F3
530 DATA BA, 27, 02, CD, 21, 8B, D5, C3
540 DATA 8B, FB, AC, AA, 0A, C8, 75, PA
```

(continues)

Figure 1: WHERE.BAS program to create WHERE.COM file finder.

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a batch file (called *SEEK.BAT*) with a %1 replaceable parameter, for example,

WHERE %1 MORE

Then just type *SEEK [drive:] filename.ext* to locate the file. Remember to make sure *MORE.COM* is the subdirectory you're logged into, or that it is properly *PATHed* to.

Model 100 WordStar

Reader Ta-Chang Lin's letter and your response in *PC*, Volume 4 Issue 3, unfortunately lead readers to believe that none of the WordStar *FIND* or *FIND AND REPLACE* commands can work directly with the Ctrl-P printer control characters. This in fact is not true. Only the underline ('S), non-break space ('O), overprint ('H), alternate pitch ('A), and standard pitch ('N) give WordStar users problems (which reader Lin's letter solves very well). For

(Figure 1 continued)

```
550 DATA C3, 8B, EA, 88, 7E, 1E, 2E, 74
560 DATA 22, BA, 27, 82, 32, C0, A2, 86
570 DATA 82, 86, 07, 97, E8, 15, 00, 97
580 DATA 88, 87, 8B, D5, 83, C2, 1E, E8
590 DATA 8A, 88, B4, 89, BA, 9F, 82, CD
600 DATA 21, 8B, D5, C3, 8B, F2, B4, 82
610 DATA AC, 8A, D8, CD, 21, AC, 8A, C8
620 DATA 75, F7, C3, 2A, 2E, 2A, 88, 48
630 DATA 3A, 5C, 88, 88, 88, 88, 88, 88
640 DATA 88, 88, 88, 88, 88, 88, 88, 88
650 DATA 88, 88, 88, 88, 88, 88, 88, 88
660 DATA 88, 88, 88, 88, 88, 88, 88, 88
670 DATA 88, 88, 88, 88, 88, 88, 88, 88
680 DATA 88, 88, 88, 88, 88, 88, 88, 88
690 DATA 88, 88, 88, 88, 88, 88, 88, 88
700 DATA 88, 88, 88, 88, 88, 88, 88, 88
710 DATA 88, 88, 88, 88, 88, 88, 88, 88
720 DATA 88, 88, 88, 88, 88, 88, 88, 88
730 DATA 88, 2A, 2E, 2A, 88, 88, 88, 88
740 DATA 88, 88, 88, 88, 88, 88, FF, 4E
750 DATA 6F, 28, 6D, 61, 74, 63, 68, 69
760 DATA 6E, 67, 28, 66, 69, 6C, 65, 73
770 DATA 28, 66, 6F, 75, 6E, 64, 2E, 8D
780 DATA 8A, 24
```

(Figure 1 ends)

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USER-TO-USER

any of the others, at the "FIND?" prompt simply type Ctrl-P followed by Ctrl-(and whatever key is appropriate), and that control symbol will appear on the screen and be found by the program without resorting

to the Alt key sequences.

As an added tip, for those readers who might be using a TRS-80 Model 100 lap computer to create text for later transfer to *WordStar*, the print control symbols can

be entered directly into the file with the Model 100. Simply add 128 to the decimal ASCII value of the control character in question and put that symbol into the Model 100 file. For example, bold print ("B") becomes character 130 (2 + 128), or <Graph>f — a lower case "f" — and underline ("S") becomes character 147 (19 + 128) or <Graph>q — a lower case "q".

The ALT sequences, *WordStar* FIND/REPLACE responses, and Model 100 characters are summarized in the table in Figure 2.

Tom Simondi
Los Angeles, California

We thought everyone knew about the magic of Ctrl-P, and didn't bother mentioning it. But thanks for the reminder—many other readers pointed this out as well. We agree that Mr. Lin's Alt+147 underline trick is wonderful, especially at PC where

Printing affect		ASCII	FIND/REPLACE command	Model 100 key
Underline	"PB	147	Only ALT-147	<Graph>q
Boldface	"PB	130	<"P">"B" or ALT-130	<Graph>f
Double	"PD	132	<"P">"D" or ALT-132	<Graph>c
Strikeout	"PK	152	<"P">"K" or ALT-152	<Graph>o
Superscript	"PV	158	<"P">"V" or ALT-158	<Graph>n
Overprint	"PI	148	<"P">"I" or ALT-148	<Graph>w
Non-break space	"PO	143	Only ALT-143	<Graph>l
Phantom space	"PF	134	<"P">"F" or ALT-134	<Graph>e
Phantom tabout	"PT	135	<"P">"T" or ALT-135	<Graph>h
Alternata pitch	"PA	129	Only ALT-129	<Graph>m
Standard pitch	"PW	142	Only ALT-142	<Graph>i
Printing pause	"PC	131	<"P">"C" or ALT-131	<Graph>x
Ribbon color	"PT	153	<"P">"T" or ALT-153	<Graph>g
User area 1	"PU	145	<"P">"U" or ALT-145	<Graph>u
User area 2	"PV	151	<"P">"V" or ALT-151	<Graph>a
User area 3	"PW	133	<"P">"W" or ALT-133	<Graph>e
User area 4	"PK	146	<"P">"K" or ALT-146	<Graph>f

Figure 2: Table of *WordStar* printer control characters and their ALT-key and Radio Shack Model 100 equivalents.

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USER-TO-USER

we italicize the names of all software packages. And thanks for the combination print effect summary and Model 100 WordStar conversion chart—though the Model 100 owners we know simply use their laptop to enter straight text, then do such fine-tuning as underlining and boldfacing later on their bigger systems.

PC Sound Effect

I have found an interesting way to produce a truly unique sound effect on an IBM PC. If you do not have a cassette player connected to your computer for storage (I've never seen a PC that did), you can take advantage of IBM BASIC's MOTOR statement.

The undocumented feature of MOTOR is that it produces a loud "click" from the cassette port inside the computer. When used in rapid succession, this can provide several fantastic sound effects that can work especially well in games. For a clicking sound, try typing in the following program:

```
10 FOR A=1 TO 1000
20 MOTOR
30 FOR Y=1 TO 50
40 NEXT: NEXT
```

Change the 50 in line 30 to a 3 for a buzzing sound. By experimenting with different delays in line 30, you can create various other interesting sounds. Unfortunately, this works only on an IBM PC and doesn't do anything on compatibles, which lack cassette ports.

Michael B. Elowitz
Los Angeles, California

It also doesn't work on PC-XTs or ATs, which lack cassette ports. But on a PC, using it in a loop produces a range of interesting buzzes and motor sounds.

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PC Tutor

Beyond the 64K Barrier

Q: We purchased an IBM PC intending to program the software we needed for our particular office requirements. We knew the IBM BASIC interpreter could only access 64K of memory. After being



assured that the IBM BASIC compiler could utilize the full memory capabilities of the computer (we have 320K), we purchased it.

Sad to say, unless we're overlooking something, the compiler can still only use a scant 64K.

We've tried using the CLEAR statement in compiled programs, but with a number greater than 65,535 we still get an overflow error. Is there any way to force the compiler to utilize more string space in memory?

Jesse Underwood
El Paso, Texas

A: As you've sadly realized, both IBM BASIC systems (interpreted and compiled) are more or less restricted to 64K of code and data.

If you absolutely need to use additional memory, you have the following options: (1) switch to a different (non-IBM/Microsoft) BASIC; (2) use a paging scheme to swap additional strings in and out; or (3)

switch to a different language entirely. Let's examine each of these choices.

(1) Switching to a different BASIC. While there are undoubtedly others, the only large-model BASIC with which I have had personal experience is Morgan Computing's Professional BASIC. It has no PLAY command, no VARPTR, and a few other features of IBM PC-BASIC are missing, so I would hesitate to recommend it without a thorough test. On the other hand, it does offer semicompilation, window-based debugging, and (of course) support for a full megabyte of memory. Given a retail price of only \$99, this is certainly a package you might well want to check out.

(2) Using a paging scheme. This is an awkward approach, but it is workable with the current IBM BASICs. There are three possible ways to page your memory so as to access more than 64K.

(a) Use files to hold data variables. This is the most robust approach, though it is also the slowest of the three. By reading/writing data into files, you can use as much memory as will fit on a hard disk. And if you need more speed, you can take some of your 320K and turn it into a RAM-disk.

(b) Use DEF SEG along with PEEK and POKE to transfer data between the inaccessible portions of memory. This method is likely to be a bit quicker than method (a), but it is much less robust. Let me give you an example.

The first step is to decide where your BASIC program will end. Let's suppose this is at 3000:0000 hex. You could then swap a fixed-length character vector VEC5 as follows:

```
100 'swap vector VEC5 out to memory
110 DEF SEG = &h3000 'set up segment
120 FOR I=0 TO LEN(VEC5)
130 POKE I,VEC5(I) 'save vector (I)
140 NEXT I
200 'swap vector VEC5 in from memory
210 DEF SEG = &h3000 'set up segment
220 FOR I=0 TO LEN(VEC5)
230 VEC5(I) = PEEK(I) 'save vector (I)
240 NEXT I
```

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PC TUTOR

This approach is less robust because it requires calculating the end of the BASIC and data area in memory. I know of no completely reliable way to do this. With the BASIC compiler, you have a bit easier job, however, since the segment registers are directly accessible from within the compiler.

(Another way to allocate the storage would be to run a RAMdisk and use the RAMdisk-allocated memory directly).

Personally, many years of programming have taught me that an unstructured BASIC (e.g., IBM's) is the worst language to use when creating a robust program.

(c) You will probably find that the approach given in (b) is still very slow, since you have to peek and poke each individual character in the string. However, you could develop a simple assembly language routine that would significantly speed up the process.

(3) Switching to a new language. If you are planning on doing a lot of programming and desperately need to use more memory, I would seriously suggest investigating other languages. Three languages and implementations I would particularly recommend are: APL: APL*PLUS/PC by STSC, Inc., C: Lattice C (sold by Lifeboat Associates), and PASCAL: Turbo Pascal (Borland International).

Even if you feel comfortable with BASIC, I think you may find that the time investment required to learn a new language will be well repaid in ease of use, ability to talk to additional memory, and transportability. Personally, many years of programming have taught me that an unstructured BASIC (e.g., IBM's) is the worst language to use when creating a robust program.

Adding a Bit of Color

Q: I've been trying to add some much-needed color output to software packages

that weren't originally written to support it. According to the IBM Technical Reference manual, it seems that I should write an I/O OUT command to port address 3D9. How do I do it?

Dominic Songco
New York, New York

A: The port you mention is the Color Select Register for the IBM color card. While it does allow you to set a border color in alphanumeric modes, that's about all you can do with it. The function of the bits addressed by this port is as follows:

Bits 0-2—B/G/R select the border color

Bit 3—intensify border color
These 4 bits select the border color in alphanumeric modes. (In graphics mode these bits set the background color).

Bit 4—select alternate background color or set

This selects an intensified set of background colors in alphanumeric and graphics modes.

Bit 5—color palette select (graphics only)

This selects the set of screen colors (cyan/magenta/white) or (green/red/yellow).

As I have indicated, the 3D9 port is not going to be of much use to you in character modes, except to set up a border color. If that is all you need, the following program, which you can enter with DEBUG.COM, will create a dark-blue border when used with the normal IBM color monitor and color board, but I must warn that with other monitors or boards it could conceivably cause damage. (It's a prime example of a not-very-robust program, in other words). To enter the program, type the underlined words below.

A>DEBUG BORDER.COM

File not found

-1100

XXXX:0100 MOV AL,1

XXXX:0102 MOV DX,3D9

XXXX:0105 OUT DX,AL

XXXX:0106 MOV AX,4C00

XXXX:0109 JNE 2A

XXXX:0100 <carriage return>

-1CX

OK 0000

18912

-M

-4

More-satisfactory methods of achieving color output can range from simple to complex. The simplest answer is to just

PC TUTOR

```
A>DEBUG SCR.COM
file not found
-A100
LE9F:0100 mov AX,600 ;assemble at 100
LE9F:0103 mov CX,0 ;scroll up full window
LE9F:0106 mov DX,183F ;upper left is 0,0
LE9F:0109 mov BH,03 ;lower right is 24,79
; here you are:
;BH is the attribute, a two digit number
;stop digit (0) is background color
;next digit (3) is foreground color
;set this as you like, try it out
;call IBM video BIOS
;prepare to exit
;exit, no error
;change CX to length of program
LE9F:010B int 10
LE9F:010D mov AX,4C00
LE9F:0110 int 21
~rCX
CX 0000
:0020 ; approx. 20hex
~w ;write the file
~q ;done
```

Figure 1: This assembly language program clears the screen to a specific color.

clear the screen to the desired color and then proceed, hoping that your program does not alter the screen coloring. A tougher approach is to use the ANSI.SYS method of sending escape sequences to set screen color. The final approach requires actually modifying the program in question to achieve color.

To see whether the simple approach will work, you should try entering the program I have shown, with comments, in Figure 1. Again, the easiest way to go about this is to use the DEBUG.COM utility. (I have not underlined the words that you should type this time, as the procedure is similar to that above).

Once you have created this little program, you can just run it by name: at the A> simply type SCR. On a color display, it will change the screen color. Here, I used a value of 03 for the screen color (light blue on a black background), but you can try other combinations of color settings. You'll probably find that the color will be retained on some programs and lost when you boot up others, but that's the price of simplicity.

Junior's Potential

Q: I recently bought an enhanced PCjr with one disk drive and 128K RAM. I originally thought this meant that I had 128,000 (actually 128×1,024 or 131,072) bytes of memory. While I was studying a graphics tutorial, however, I noticed that the authors (Illowsky and Abrash) begin their discussion of addressing memory

bytes (not bits) with the remark that the PCjr has approximately one million addressable bytes.

How did my 128K machine suddenly turn into 1,024K?

Richard R. Conboy
Albert Lea, Minnesota

A: There is a bit of difference between what you have actually installed in your computer and what it is theoretically capable of using (addressing). When you purchased a 128K PCjr, that did not imply that you could not expand its memory later. You can.

The processor in the PCjr (and in the PC) is an 8088 processor, which has a 20-bit address bus. A bus this size means that the 8088 can directly address up to 111111111111111111b (or FFFFFFFh or 1,024K) bytes of memory. In fact, even in the PCjr, the address B8000h (or 736K) is used for video. In your case, the addresses between 128K and 736K are currently blank, but potentially usable.

In addition to IBM, a number of companies offer memory expansion kits for the PCjr. While these also involve beefing up the power supply, for serious computing they are well worth it.

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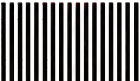
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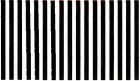
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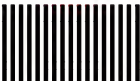
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Stock Analysis: Fundamental Knowledge

Using the techniques of fundamental stock analysis and software providing fundamental stock information, you can extract a short, specific list of stocks out of a huge listing of available choices.

Fundamental stock analysis is a tool that helps you judge the inherent value of a stock relative to its current market price. The idea behind this type of analysis is to pinpoint undervalued stocks to buy and overpriced stocks to sell. While fundamental analysis is a profession in itself, investors from many different backgrounds use its techniques to good advantage.

The questions posed by this form of stock analysis are indeed fundamental: Is this company making any money? How much? How is it likely to be passed out? And how well is the company doing in relation to other publicly held companies that you might want to invest in?

This last question is one for the PC. There are a half-dozen major programs now available for fundamental stock screening. They enable you to extract, from up to 10,000 stocks, a list of stocks that meet your fundamental criteria. For example, you might favor only companies that faithfully distribute generous dividends. Another investor might prefer



investments based on exponential sales growth fueled by retained earnings. Once you have specified what you want, these programs list the stocks that meet your requirements.

The PC Advantage

If you have already been using fundamental analysis, you may feel that you've been working and reworking a stale supply of, say, 100 stocks. A PC can expand the scope of your attention to include many thousands of different stocks. If you are a market professional with established sources of fundamental data, you may be surprised at how the newest software can pare down your research expenses. If you have never tried fundamental analysis, you will find that learning to use a screening program is a good way to get started with this ap-

proach to the evaluation of stocks.

All of these programs are either supplied with, or grant access to, a large database of current fundamental stock information. In a typical session, you might begin by extracting a list of all those companies that are in, say, the pharmaceutical manufacturing business. From this comprehensive but unwieldy list you could draw up a second, smaller list composed of all pharmaceutical companies with revenues in excess of \$100 million. Then you could prepare a third, still smaller list composed of those pharmaceutical companies with revenues in excess of \$100 million and profit margins in the range of 12 to 14 percent.

With more added conditions, the list shrinks. Ultimately, you print a manageable list of stocks that looks attractive to you. Some other criteria for screening



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FINANCE

stocks typically include stipulations about rates of growth, return on equity, volatility, and the level of institutional holdings.

All this is useful, but beware of one expensive pitfall—downloading. The price/volume data that supports technical analyses can come down via modem for about \$100 per 360K. But if you download fundamental data (earnings per share, institutional holdings, dividends, net income, shares, and so on) the price for filling a 360K floppy can shoot up to a cool \$6,000. How do the various programs deal with this price barrier? What compromises in the way of timeliness, accuracy, and ease of access must you accept in order to get around it?



STOCKPAK II

Standard & Poor's Corp.

25 Broadway
New York, NY 10004
(212) 208-8000

List Price: \$30 initial charge; \$245 for 12-disk subscription.

Requires: 128K RAM, graphics cards optional.

Database: Standard & Poor's; 4,600 stocks.

CIRCLE 697 ON READER SERVICE CARD

MARKET MICROSCOPE

Dow Jones & Co., Inc.

P.O. Box 300
Princeton, NJ 08540
(800) 257-5114

List Price: \$349

Requires: 128K RAM, asynchronous communications, DOS 1.1.

Database: Media General; 3,150 stocks.

CIRCLE 696 ON READER SERVICE CARD

The Fundamental Investor

Savant Corp.

P.O. Box 440278
Houston, TX 77244-0278
(713) 556-8363

List Price: \$395; \$275 for 12-disk subscription. Downloaded data additional.

Requires: 256K RAM, two disk drives.

Database: Disclosure, Inc.; 10,000 stocks.

CIRCLE 695 ON READER SERVICE CARD

Economical Options

One answer is to buy fundamental data already on floppy disks. Value Line, Inc.'s *VALUE SCREEN* and *Standard &*

If you download
fundamental data, the
price for filling a 360K
floppy can shoot up to a
cool \$6,000.

Poor's *STOCKPAK II* both offer data on disk on a subscription basis.

Prices are not directly comparable, but they seem to fall in the range of \$20 to \$30 per disk of 1,500 to 1,700 companies.

Standard & Poor's and Value Line market their disks in 12-month subscriptions. In addition, Value Line sells a quarterly subscription that costs \$211 the first year and \$166 afterwards. Fundamental data is reported quarterly by companies, so a four-disk subscription would suffice for many investors.

Both *STOCKPAK II* and *VALUE SCREEN* disks cost less than downloaded data. The compromise is in timeliness. The information canned on your monthly or quarterly disk has already aged a bit by the time you receive it, and there is not yet a provision for updating the information.

Fundamentally oriented investors tend to take a long-term view of the market. But their overarching interest is the measurement of value against price—today's price—so the value of data on disk decays rapidly over time.

However, this year, Value Line plans to introduce an as-yet-unspecified means of updating both price and fundamental data items on its disks over modem.

At the opposite extreme in terms of price and immediacy is Dow Jones & Company's *MARKET MICROSCOPE*. This program operates exclusively on downloaded data and is therefore very costly to operate.

The Fundamental Approach

Savant Corporation's *Fundamental Investor* combines several approaches to data gathering. Savant offers monthly sub-

FINANCE

scriptions to data on floppy disks. But you can also write updated fundamental and price-related data onto the disks with a modem or manually from the keyboard. The fundamental data selection can be expanded slightly with downloaded data items for all companies—or enriched for a few stocks of particular interest.

Savant supplies two sets of three disks to subscribers every month. The first set includes data on 5,500 stocks commonly traded on both major exchanges and over-the-counter, sorted in order of asset value. The other set covers 4,500 relatively obscure and infrequently traded stocks. A 12-disk annual subscription costs \$275, or about \$23 per disk. The

The Fundamental Investor has many intelligent features, but selective downloading matters most. It makes data more economical.

Fundamental Investor program, which acts as the database manager of this information, costs \$395, a one-time expense.

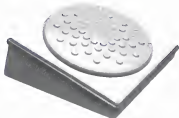
For each company in the database, 35 data items most likely to be desired for an initial screening are provided. You can update the 35 items already on file for the remaining companies of interest, or expand these files to include as many as 200 items per company. You cannot, however, easily transfer data onto a spreadsheet for modeling purposes, but Savant plans to provide a spreadsheet link in the future.

When you download prices, the *Fundamental Investor* automatically recalculates all price-related items. Since fundamental downloading is handled selectively, you can choose the data you want for a given company.

Similarly, you might select one item of interest and download it for every company on the disk. The program has many other intelligent features (statistical

summaries, for one), but selective downloading matters most. It makes fundamental data more economical—and accessible—without sacrificing much. It

is clear from the functions and scope of these programs that fundamental analysis programs are finding their proper shape. ■



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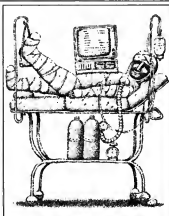
Most people believe that an expert clinician is a sort of medical detective, who combines an extraordinary command of some domain of clinical medicine with an uncanny ability to make the right decision on the basis of limited data. The simple truth, however, is that no physician remembers and uses all the information she or he learned in medical school.

The *Problem Knowledge Couplers* and its related series of packages, the *PKC Development System*, the *PKC Network & Documentation Maintenance System*, and the *PKC Medical Records System* help physicians overcome limitations imposed by their memories. This series of packages, from the Vermont-based PKC Corporation, arose from the research of Lawrence L. Weed, M.D., the company's founder and sole proprietor, with the Problem-Oriented Medical Information System (PROMIS) at the University of Vermont's College of Medicine.

Forming Diagnoses

The *Problem Knowledge Couplers* relates the condition of a particular patient to a large body of relevant medical knowledge to help you arrive at a diagnosis and determine treatment. The other programs in the series all support the couplers by helping you modify and design your own couplers or organize and analyze the data obtained from the couplers.

The *Problem Knowledge Couplers* program consists of ten modules: *History*



and Physical Examinations, Acute Abdomen, Headache, Hypertensions, Stepped Management of Essential Hypertension, Upper & Lower Respiratory and Other ENT Complaints, Hypercalcemia, and Chest Pain I and II. Five new couplers are due soon: *Vertigo, Memory Loss/Confusion, Jaundice, Knee Problems, and Abnormal Vaginal Bleeding*.

Initially, a coupler helps you collect clinical data. The coupler module disciplines you to be thorough in your examination by giving you a detailed questionnaire. It then calls up from its database all the known causes for a certain condition, both the common and obscure alike. By electronically relating your findings to relevant information culled from medical textbooks and journals, the coupler restricts the range of possible solutions and

shows them to you right on the screen. This procedure circumvents premature categorizations and a natural tendency to rely on probabilities instead of actualities. Finally, the coupler prints a record of the whole "coupling session."

The Acute Abdomen Module

Typically, you might use two monitors during an examination to run through a program along with a patient, or patients could fill out the preliminary questionnaire on-screen or in printed form in the waiting room. The *Acute Abdomen* coupler asks, "Where is your pain?" and several choices appear: right upper quadrant, right lower quadrant; left upper quadrant; left lower quadrant; epigastric and/or periumbilical; periumbilical combined with pain in limbs or back; generalized/poorly localized; hypogastric; suprapubic and/or presacral.

Then the program asks such questions as: "When does it hurt?" and "What makes it better/worse?" After you type in the numbers of the appropriate choices, a constellation of diagnoses, treatments, and symptoms that fit your patient can be arrayed.

After mobilizing the relevant data, the *Acute Abdomen Module* presents a list of possible causes. At this point, you match a suggested cause to the findings at hand and learn which findings point to that particular cause and which counterindicate it. For instance, if after examining your patient, you choose mesenteric vascular insufficiency as the cause, the program might then alert you that although

MEDICINE

eight findings for that potential cause were present, two—distension of the abdomen and epigastric and/or periumbilical pain—were not. Further explanation would then follow.



PKC Software Products

PKC Corp.
10 Mary St.
South Burlington, VT 05401
(802) 658-5351

List Price: *Problem Knowledge Couplers*, \$95 each; *PKC Development System*, \$495; *PKC Knowledge Network and Documentation System*, \$395; *PKC Medical Records System*, \$695; four user manuals, \$50; special group price, \$1,495.

Requires: 128K RAM, two double-sided disk drives.

CIRCLE 682 ON READER SERVICE CARD

A Memory Jogger

Feedback from doctors who have purchased the PKC software systems has been positive. Grattan C. Woodson, Jr., M.D., an internist in Atlanta, Georgia, says the "couplers reduce the likely possibilities to a manageable number and ensure that you don't miss the one rare cause that you may not have seen—or at least don't think about every day. They're a memory jogger."

However, Leonard R. Kowalski, M.D., medical director of Health Services for Martin Marietta Corporation in Denver, Colorado, explains why the couplers, more than just mnemonic devices are akin to having a specialized, on-line consultation service. "You're talking about the equivalent of 100 doctors looking at a case simultaneously. You can't do that in reality." Weed claims that each coupler "is the product of far more research, clinical experience,

and work than can be performed or grasped by any one individual."

Coupler Drawbacks

One limitation of the PKC system is that the couplers don't address drug interaction. Another drawback, according to Richard Gibson, M.D., a general practitioner in family practice in Forks, Washington, who helped develop the *Abnormal Vaginal Bleeding* coupler, is the cumbersome and time-consuming updating process. He suggests that the couplers should be continuously updated by experts and sent out on disks so that doctors don't have to worry about reading current journals and entering data. Weed plans to revise the couplers periodically, but doctors "can't expect regular updates."

Customizing Couplers

The system's ancillary programs are

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CIRCLE 340 ON READER SERVICE CARD

also useful to physicians. The *PKC Development System* allows you to modify and customize existing couplers and even build your own from scratch. For example, Louis M. Abbey, D.D.S., of the School of Dentistry's Department of Oral Pathology at Virginia Commonwealth University in Richmond, Virginia, could streamline his *ENT* (ears, nose, and throat) coupler to make it more applicable for dentists, deleting some details and adding such common radiographic findings as periapical radiolucency.

The *PKC Network and Documentation Maintenance System* organizes medical information into causal connections between symptoms, diagnoses, and treatments. This structured database creates the building blocks for couplers for the various medical specialties.

Using the *Medical Records System*, Gibson has painstakingly coded 2,300 medical entities so far. The system then

helps him retrieve and analyze clinical records and pursue hypotheses generated by the couplers. "The *Medical Records System* is in its infancy," he says. "The product needs to be adapted to actual practice."

Keypunch Doctors

Some people may question whether the use of a computerized system in such

The PKC system organizes medical information into causal connections between symptoms, diagnoses, and treatment.

human processes as diagnosis and treatment might undermine the doctor/patient relationship and reduce the physician's

role to one of a mere keypunch operator. Defending the system, Woodson says that "These days most people recognize that doctors are human. Patients realize that medicine is complicated, and they would like to see us get all the help we can. I have yet to have a patient object to it."

The PKC software system supplements a doctor's experience and will never replace the human element in patient diagnosis. "The package doesn't pretend to make decisions for the practitioner," Abbey notes. "It just sets forth the options." And the constant repetition of symptoms that a doctor would rarely encounter would mean memory reinforcement and make physicians more learned. Gibson adds: "It's a tool, just like an X-ray or a stethoscope. It won't replace talking to people or being sympathetic, but it does free my mind from remembering minutiae and allows more room for compassion." ■

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Peace of Mind

If you're not worried about the security of your microcomputer, perhaps you should be. PCs and peripherals are prime targets of thieves, but a variety of products can help reduce the risk.

During the 1970s, the ubiquitous IBM Selectric typewriter was the prime office-theft target. It was easy to steal, easy to sell, and commanded top dollar in almost any condition.

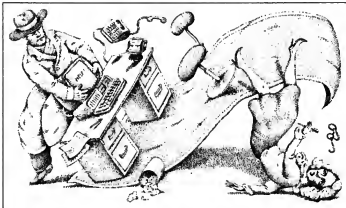
Thieves were brazen. A receptionist might swivel around to the file cabinet to answer a request from a visitor and, upon turning back, find that both the visitor and the typewriter had disappeared. Criminals posing as repairmen carried them out through the front door, and dishonest employees popped them into shopping bags at day's end.

This decade may see the same phenomenon with the IBM PC. Lessons have been learned from the Selectric experience, and a vast array of protective devices for microcomputers is already on the market. All offer various degrees of protection but generally compromise user flexibility to some extent. And, of course, no device is a complete defense against a determined thief.

The Immobilizers

One family of PC-keepers might be called "the immobilizers." These hold-overs from the Selectric era simply fasten the equipment to the work surface to make theft more difficult.

The simplest immobilizer is merely a pair of screws or carriage bolts that fasten each component onto the desk, generally from inside the unit. This works well with metal-framed typewriters, but it's less effective with today's lighter, plastic housings. It is also rather permanent. A variation using a pair of bolts with a small barrel lock replacing the nut at the



end allows quicker removal by authorized personnel when necessary.

More complex immobilizers use a locking base. Here, a plate fastened to the work surface locks into another plate attached to the equipment. One version replaces the lock with a maze-like lower plate that requires specific directional movements of the equipment to detach it from the desk.

More Flexibility

To provide more flexibility of placement and adjustment, "semi-immobilizers" use twisted steel cables, generally covered with colored vinyl, to attach PCs to work surfaces. Many of these cables are less than 1/4-inch in diameter and can be cut with an easily concealed hand tool. Still, they will deter an unprepared hit-and-run thief.

Cable systems have two more weak points. First, most cable sets come with a cheap lock that's even flimsier than the cable. (On the other hand, if you ever lose the key or forget the combination and have to force it open, you'll find it is much easier and cheaper to replace the lock than ruin the cable.) The second drawback is that cable sets designed for user installation generally rely upon plastic adhesive-coated mounts to fasten the cable. These mounts are neat, quick, and don't mar the PC's case or the furniture, but despite the claims of vendors and manufacturers, they are not very strong. Think about how easily you would remove the adhesive pad when a new desk is delivered, and remember that a thief wouldn't be nearly as interested in neatness. These cable systems will stop only the most casual thieves.

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BUSINESS

Some cable sets employ fairly heavy-duty vinyl-clad steel cables, strong locks, and physical, rather than adhesive, mounts. These are not budget priced, and you may need three or more for your PC's various components. Still, heavy-duty cable sets can be a viable solution for high-risk situations where day-time theft is a concern and the tangled appearance of heavy cables is not.

Power Cord Alarms

Other systems use the power cord as the security cable, locking it to the desk or to the wall outlet. Of course, it's easier to cut a power cord than a cable, but that means disfiguring the machine and lowering its underground resale value.

Several manufacturers have added devices to sound a self-contained alarm if the power cord is removed or cut. Some of these accommodate several cords at once and even work when the power is off. Of course, someone must be around to hear the alarm, and this system complicates moving the PC from desk to desk. Worse, these systems don't protect the keyboard.

Other alarm systems use wire loops to connect each component to a small control box housing a siren. The alarm sounds if someone cuts or unplugs the wires without first deactivating the key switch. Aside from protecting the keyboard, this method is little better than using the power cords to trip the alarm, and it adds to the spaghetti factory of wires surrounding a multicomponent microcomputer system.

Shock Sensors

Sophisticated building alarm systems often employ shock sensors to detect window breakage or attacks on walls or ceilings. The simplest of these operate on a pendulum principle, which breaks a circuit when something jabs, tilts, or moves the sensor. New computer alarms employ such sensors attached to each PC component and wired to a desktop control box. Unfortunately, these devices can't discriminate between owner and thief, so you'd better be happy with your microcomputer right where it is.

A more sophisticated variation of this approach fastens the control box and mo-



tion sensor to the back of your CPU, with the power cords from the other components enclosed within its locked housing. This motion sensor/power cord lock combination detects movement of the CPU but allows you to move the monitor and keyboard and forces a thief to cut some cords to steal pieces of the system.

Before shopping for a PC protector, consider what type of risk is involved. A PC in a well-populated interior office is not prone to hit-and-run thievery, but it may well be the target of a weekend break-in.

If daytime theft is not a major concern, the best solution may be to simply lock up the entire PC at night. The problem is to find a secure place. Most file cabinets and desk drawers are easily forced by professionals, but their locks may deter an amateur.

Computer furniture that incorporates lockable compartments for nighttime storage can act as a security system, but make sure the structure is sturdy. An intruder won't be as neat as you, so you may have to add a furniture repair bill to your losses. However, if the equipment isn't visible, it may not be taken.

Risk Analysis

Before shopping for a PC protector, consider what type of risk is involved. A PC in a well-populated interior office is not prone to hit-and-run thievery, but it may well be the target of a weekend break-in. An enclosure might be most appropriate for this kind of installation, but it wouldn't help an outer-office receptionist with a desktop unit that's vulnerable during business hours. A cable lock might be the best bet in that instance. An alarm may not give enough notice to stop a swift thief in an outer reception area, but it should help prevent daytime thefts from interior areas. Un-

less, of course, everyone goes out to lunch at the same time.

The point is not that you cannot protect your equipment, but that such protection is at best imperfect and involves some

compromises. Try to select the security device that suits your situation and your budget. You might find that investing in a good door lock or alarm system offers the best protection for the money. ■

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Model B106 Expansion Chassis

A six-slot expansion chassis/card cage featuring a 65-watt power supply, 1-inch slot spacing, fan, and a low-noise backplane.

The Model B106 Expansion Chassis is connected to the user's system with two Action bus expansion cards, available as the Model B120 IBM-PC Bus Interface Kit. One expansion card is plugged into a slot in the user's PC and the other in the card cage. (List Price: Model B106, \$795; Mdl. B120 Kit, \$195)

Action Instruments, Inc.
8601 Aero Dr.
San Diego, CA 92123
(619) 279-5726

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WSB-10 Arbitrary Waveform Generator

A plug-in board that generates single-cycle, periodic, or burst waveforms in either single-cycle or continuous modes from as many as 2,048 user-defined data points. A 16-bit program-

mable timer sets the output rate from 2.4 millihertz to 5 megahertz. Output resolution is 12 bits with a range of ± 5 volts.

Once the board has been initialized, it operates as a standalone unit, freeing the PC for other uses. Software containing BASIC-callable drivers is supplied with each board.

(List Price: \$595)

Qua Tech, Inc.

478 E. Exchange St.

Akron, OH 44304

(216) 434-3154

CIRCLE 624 ON
READER SERVICE CARD

I² 10MB DiskSystem

A half-height 5¼-inch Winchester drive compatible with PC-DOS 2.0. This internal hard disk features a data transfer rate of 5 megabits per second and has an average access time of 18 msec. Included with the I² drive is a full-height face-plate.

(List Price: \$1,095)

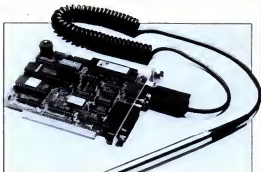
P Interface, Inc.

21101 Osborne St.

Canoga Park, CA 91304

(818) 341-7914

CIRCLE 623 ON
READER SERVICE CARD



Aedex BCS-100 Bar Code System, Aedex Corp.

Aedex BCS-100 Bar Code System

A bar code reading system consisting of a single, half-sized board with attachable hand-held wand. Unlike similar systems that are installed on the PC's keyboard line, the BCS-100 reader can be installed without modification to hardware or software. This allows the board to work with such systems as the Compaq or the IBM AT, which have keyboards that preclude the use of on-line attachments.

The bar code reader automatically discriminates between the five major bar code systems—UPC, EAN,

Codabar, Code 39, and Interleaved 2-of-5—by using a proprietary IC decoder. It also permits the user to print two of the code types (UPC and Code 39) using a graphics printer.

The board includes a connector for the hand-held scanning wand and a 25-pin connector that accepts RS-232, RS-422, or current loop protocol input devices. Multiple inputs can be obtained through chaining or multiplexing boards. This provides the user with virtually unlimited input options.

(List Price: Board only, \$695; with all options, \$895)

Aedex Corp.

181 W. Orangeflor Ave.

Placentia, CA 92670

(714) 528-4700

CIRCLE 631 ON
READER SERVICE CARD



WSB-10 Arbitrary Waveform Generator, Qua Tech, Inc.

GPIB-PCjr

An IEEE-488 interface for the IBM PCjr, allowing the small IBM system to be used in test and measurement applications, instru-

ment control, and scientific data acquisition. The GPIB-PCjr performs software installation and verification; it also runs a hardware diagnostic to verify hardware configuration. An included utility allows users to edit the definitions of devices and boards in the system, including each device's GPIB address, read/write termination mode, and I/O timeout limits.

Since built-in device drivers perform all the necessary data routing, application programs can refer to installed devices by symbolic names. Also, printers and plotters linked through the interface can be accessed with standard DOS calls.

The GPIB-PCjr permits both synchronous and asynchronous I/O functions, with automatic serial polling. Integer array functions built into the software eliminates the usual I/O limitation of strings less than 255 bytes; the system can work with arrays of up to 64K bytes. The automatic polling feature can poll the entire bus without custom programming by the user, providing status responses from polled instruments as required by an application program. (List Price: GPIB-PCjr, \$385; software, \$75) **National Instruments** 12109 Technology Blvd. Austin, TX 78729 (800) 531-5066 (512) 250-9119

CIRCLE 629 ON
READER SERVICE CARD

SOFTWARE

PhotoBase

A program capable of merging visual images, such as photographs, into the database files created by such software as *dBASE II*, *R:Base 4000*, and *The IBM Filing Assistant*. *PhotoBase* allows images stored in a separate "photo album" file to be selected and recalled by the user's database management program using standard database file descriptors. Pictures may be captured before, during, or after a data file is established, and may be accessed directly from PC-DOS.

The photo image files are created with pictures captured from a VCR or video camera by the *PhotoBase* image manager and the PC-EYE Video Capture Board (available with the software). Any database management system that writes to the display using the system BIOS will work with

PhotoBase. At the present time, the software supports only the Tecmar GraphicsMaster high-resolution graphics adapter.

Each picture is stored with 320 x 200 pixel resolution and 16 levels of gray scale. Pictures are recalled as a 1/4-screen image in an upper quadrant of the screen and can be expanded with a keystroke to fill the entire screen. Data and text are merged around the picture to provide an integrated display.

Printer support is included for the Epson FX series, the IBM Graphics Printer, and the H-P ThinkJet. Printed output can be picture only, text only, or both.

(List Price: With PC-EYE Video Capture System, \$690; software alone, \$235)

Requires: 64K RAM above that required by the user's DBMS; two disk drives, PC-DOS 2.x, PC-EYE board, Tecmar GraphicsMaster, high-resolution color monitor.

Chorus Data Systems
6 Continent Blvd.
P.O. Box 370
Merrimack, NH 03054
(603) 424-2900

CIRCLE 643 ON
READER SERVICE CARD

TYPMATH

Print software allowing *WordStar* users to obtain hard copy of files with Greek and technical symbols on any NEC Spinwriter with a Technical Math thimble.

The Greek and technical symbols are flagged in the *WordStar* text file with unused control symbols. The program also interprets all of the word processor's standard print commands, and buffers output to eliminate reverse line feeds (improving character alignment on the printout).

Special features of *TYPMATH*—which do not require a Technical Math thimble—permit the printing of multiple-line headings and footings, and the placement of a vertical bar in the margin to denote document updates. Also provided in the software's manuals are techniques for developing and printing complex equations using *WordStar*.

(List Price: \$33) **Requires:** 128K RAM, one disk drive, PC-DOS, *WordStar*, Spinwriter. **Sunol Sciences Corp.** 11887 Dublin Blvd. Dublin, CA 94568 (415) 462-8209

CIRCLE 639 ON
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Chorus Data Systems	
PERSONNEL FILE	
Name	Cecile Lates
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City	Nashua
State	NH
Zip	03054
Phone	603-2900
Security reference number	111-22-3333
Job title	Administrative assistant
Age	38
Sex	F
Marital Status	S
Hair Color	Red
Eyes Color	Blue
Comments:	
Hobbies:	Ballet; Biking
Press return for next record, or Q to quit.	

PhotoBase, Chorus Data Systems

Equate

A professional mathematical equation processor geared for non-accounting business and technical applications. *Equate* allows up to 799 equations to be entered anywhere on the display screen, through the use of standard algebraic notation. When a function key is pressed, the program evaluates the equations, prompts for undefined variables, and solves equations with double-precision results. *Equate* interprets standard arithmetic operators, numeric operators (Sin, Cos, Tan, Log, Ln, Atn, and so forth), relational operators (<, >, <=, <>), and logical operators (AND, OR, NOT, XOR).

An included data file, called the Constants Window, contains over 400 physical constants and measurement conversion factors. These constants can be easily selected and inserted by the user anywhere within equations. The user can also add equations, monetary conversion factors, and other frequently used constants to this data file.

A forms feature allows the user to create application worksheets that prompt for data or arrange the results of calculations into tables. Data cells may be placed anywhere on a screen without resorting to rows and columns. Equations, results, and text can be saved as worksheets, which can be printed directly or transferred to any

ASCII word processor for further formatting before printing.

(List Price: \$195)

Requires: 128K RAM, one disk drive, PC-DOS. Banyon Systems Corp. 5632 E. Third St. Tucson, AZ 85711 (602) 745-8086

CIRCLE 636 ON READER SERVICE CARD

SMART-BASE

A menu-driven database management system with custom data-entry screen creation, report formatting, and extensive sorting/indexing features. *SMART-BASE* allows data screens to be designed with up to 40 fields. It can sort data files using up to ten key fields simultaneously, and up to six fields can be indexed.

The program can handle up to 11 data sets, each set consisting of up to 11 data files with more than 32,000 records in each file. A record can have two screens of information, plus a listing of up to 500 items that may be common to any record in any file in any set.

In addition to the above, more than 50 items can be used as search criteria on one pass of the files.

(List Price: \$150)

Requires: 128K RAM, two disk drives, PC-DOS. Intelligent Software Products, Inc. 19 Virginia Ave. Rockville Ctr., NY 11570 (516) 766-2867

CIRCLE 658 ON READER SERVICE CARD



Keyswap, Rickerdata, Inc.

Keyswap

A RAM-resident macro key utility that operates in the background, allowing the user to redefine the output of any key on the IBM PC keyboard at any time.

Keyswap allows as many as 100 different user-defined macros to exist at one time. Defined macros can be stored as a disk file for later reuse; these stored macros can be called by a batch file routine.

Keyswap offers 24 functions from its main menu. Macros can be created/edited with its built-in editor, and defined macros can be listed at any time for reference. On-line help screens and status displays

can be easily accessed from within any applications program.

Command functions allow the macro keys to be defined with either fixed or variable field data, and windows can be established for customized access from an application. It is also possible to define a macro buffer with up to 384K RAM dedicated to the macro keys.

(List Price: \$119)

Requires: 64K RAM, one disk drive, PC-DOS. Rickerdata, Inc. P.O. Box 998 Melrose, MA 02176 (617) 662-0856

CIRCLE 654 ON READER SERVICE CARD

MagLock

A hard-disk data-security system with passwords, permitting the user to secure single files, an entire directory (with or without subdirectories), or a complete hard disk in one operation. The user can assign an unlimited number of passwords to secure data on the hard disk.

(List Price: \$89)

Requires: 128K RAM, 10-MB hard disk, PC-DOS 2.x.

Michael Flinder & Assocs. Inc.
169 Burnside
Tonawanda, NY 14150
(716) 693-0584

CIRCLE 628 ON READER SERVICE CARD

Res: The Program Residency Manager

A program to make other programs RAM-resident and to assign character string macros to keys. Up to nine programs can be made concurrently resident; up to 56 keys can be redefined.

The user can configure *Res* with the included *Conres* utility to make a set of programs memory-resident automatically for specific applications. Differently configured copies of *Res* can automatically create integrated multiple-program environments, each with its own set of assigned keyboard macros.

Any applications program can be made memory-resident with the following two exceptions:

- Applications programs in which the root program uses separate overlay files.

In these cases, only the root program is made RAM-resident.

- Copy-protected programs that require a specific disk to be in drive A:.

To make these programs resident, the proper disk must be in place during initialization.

A version of *Res* is also available without the keyboard macro facility.

(List Price: With macro facility, \$90; without macros, \$60)

Requires: 256K RAM, one disk drive, PC-DOS. *SofLabs*
400 E. Anderson Ln., #306
Austin, TX 78752

CIRCLE 653 ON READER SERVICE CARD

CURSOR.Prompt

A utility that changes the shape of the DOS cursor to indicate keyboard shift and toggle key status. Toggles that affect the cursor include the CapsLock, NumLock, Ctrl, Alt, and Ins keys.

A second utility allows the user to create custom cursor shapes, including block, split-block, and invisible cursors for each of the shift/toggle key states. The utilities also allow any toggle key's cursor reshaping to be turned off independently.

(List Price: \$24.95)

Requires: 64K RAM, one disk drive, PC-DOS.

TadAlEx Software
10834 Dixon Dr. So.
Seattle, WA 98178
(206) 772-2059

CIRCLE 651 ON READER SERVICE CARD

Disk-Zip

A hard-disk directory-management program that allows the user to rapidly move from subdirectory to subdirectory with single keystrokes. *Disk-Zip* generates a series of menus that show all levels of subdirectories on a hard disk, indicating which subdirectories contain additional embedded levels. The user can freely move through the hard disk hierarchy, exit to DOS or any executable program, or produce a scrolled listing of files.

Disk-Zip can handle six levels of subdirectories with up to 36 embedded subdirectories for each level. It also simplifies file transfers between subdirectories.

(Suggested Contribution: \$35)

Requires: 64K RAM, hard disk, PC-DOS 2.x.

Applied Programming Technology
19485 Vista Plz.
Laguna Niguel, CA 92677
(714) 831-8047
(714) 495-3013
MCI Mail: M.J. Mazurowski

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A package of three programs allowing the user to treat a range of personal problems with hypnosis. The software can be used alone or in conjunction with any other self-improvement software.

The *Subliminal Suggestion*

Program allows user-created suggestions to flash on a computer screen at 30 thousandths of a second in the background while another application, such as a word processor or other software, runs in the foreground. The user can set the duration of each flash and the interval between flashes; subliminal messages can be up to 34 characters long. Suggestions are removed from the system's memory when the computer is turned off.

The *Self-Hypnosis Program* displays a series of moving graphics beginning at the "alpha" brain wave frequency as it starts an Induction Count set by the user. The Induction Count ends at the "theta" brain wave level, at which point a user-created message appears at the center of the graphics display. The duration of the session can be set from 1 to 90 minutes long; at the end of the session, the computer begins a countdown from 5 to 1, then beeps.

A *Relaxation Program* is also included in the package, similar to *Self-Hypnosis* but for a different graphics display designed to induce a state of deep relaxation very quickly.

(List Price: All three programs, \$68.95)

Requires: 64K, one disk drive, PC-DOS. *Greentree Publishers*
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(805) 483-5375

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A set of six printed reference charts outlining the proper command sequences for Lotus's 1-2-3. Available in three formats (full-sized wall charts, fold-out reference card, and overhead transparencies), the Command Path References allow the user to visually follow a command sequence's tree structure, showing all options and defaults along the way. (List Price: Fold-out Reference Card, \$5.79; Wall Charts, \$95; Overhead Transparencies, \$40) ADC Associates
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Porta-PC Mate

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(List Price: \$119; swivel base model, \$139) SOS Marketing
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(213) 857-0371

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San Francisco, CA 94105
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Smart Switch Box SSB1000

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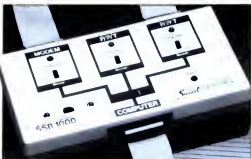
PC Guardian, Micro Security Devices

instead of the more expensive custom cables.

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Smart Switch Box SSB1000, IQ Technologies, Inc.

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1. Please include the retail price, distribution methods, and details of both hardware and software requirements needed for an end-user to properly use your new product. For software especially, this includes required amount of RAM, number and type of disk drives, operating system(s) supported, and any peripheral equipment needed.
2. Releases should be type-written double-spaced on one side of the paper. Copies of advertisements for the product may be included, but in most instances we need more

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3. Include telephone contacts for marketing and technical questions.

4. If available, include black-and-white glossy photos of the product, 4 x 5 inches or larger.

Please note that all products are run on a space-available basis. It is impossible to guarantee publication of a product announcement for any particular issue.

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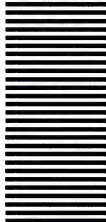
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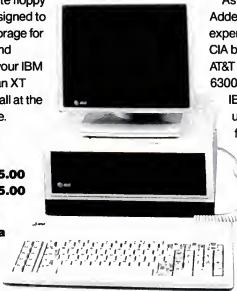
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This list is a partial directory of PC user group names and addresses. Use this listing to locate other PC aficionados who congregate in your area or around the world.

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Baltimore IBM PC Users Group

c/o Ed Honabach
1910 Trout Farm Rd.
Jarrettsville, MD 21084
(301) 557-9965

Capital User Group, Inc.

c/o Jan Withro
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Gaithersburg, MD 20878
(703) 978-1530

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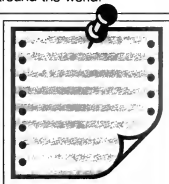
P.O. Box 567
Owings Mills, MD 21117

Annapolis PC Users Group

c/o Bill Aherne
1409 Forest Dr.
Annapolis, MD 21403
(301) 268-8779

The IBM PC Business Users Group, Inc.

40 W. Chesapeake Ave., #300
Towson, MD 21204



MASSACHUSETTS

SIG/86

c/o Joseph Boykin
47-4 Sheridan Dr.
Shrewsbury, MA 01545
(617) 845-1074
(617) 366-8911, ext. 3216

The Boston Computer Society IBM PC Users Group

The Boston Computer Society
One Center Plaza
Boston, MA 01059
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Pioneer Valley PC User Group

c/o Jeffrey Kane
P.O. Box H
North Amherst, MA 01059
(413) 549-6409

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Birmingham Bloomfield IBM PC User Group

c/o Kenneth A.E. Kernen
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(313) 647-1900

Southwestern Michigan IBM PC Users Group

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2320 Crosswind Dr.
Kalamazoo, MI 49008
(616) 349-5381

Grand Rapids IBM PC Users Group

c/o Steve Hickel
6441 28th St. SE
Grand Rapids, MI 49506
(616) 972-2178

SEMCO IBM PC SIG

c/o Darrell Frappier
P.O. Box 02426
Detroit, MI 48202
(313) 532-1390

PC will publish a periodic listing of PC user groups. Send new addresses or address changes to Club News, PC, One Park Ave., New York, NY 10016. New groups and address changes are shown entirely in **boldface**.

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Saginaw Valley IBM-PC Users Group

c/o Barry Kuznicki
Inacomp Computer Centers
3580 Bay Road
Saginaw, MI 48603

Grosse Pointe IBM PC Users Group

c/o Michael S. Skaff, Ph.D.
585 Saddle Ln.
Grosse Pointe Woods, MI 48236

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Columbia, MO 65201
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Kansas City, MO 64113
(816) 444-8709

IBM PC Users Group of St. Louis

c/o Dave Zumbro
P.O. Box 837
St. Louis, MO 63188
CompuServe #74405, 1252

Saint Louis Users' Group for the IBM PC

Box 69099
St. Louis, MO 63169

NEVADA

Southern Nevada IBM Users' Group

c/o Bruce C. Fisher
3428 South Pino Circle
Las Vegas, NV 89121

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Portsmouth PC Users Group

c/o Cynthia W. Harriman
57 South St.
Portsmouth, NH 03801
(603) 436-1608

NEW JERSEY

Central Jersey IBM/PC Information Exchange

108 Battin Rd.
Fair Haven, NJ 07701

North Jersey IBM PC Club

P.O. Box 497
New Providence, NJ 07974

Princeton IBM PC Users Group

P.O. Box 291
Princeton, NJ 08553

The Amateur Computer Group of New Jersey

c/o Carol A. Ziemba
IBM PC Users Group
P.O. Box 319
South Bound Brook, NJ 08880
(201) 885-3569

Mid-Jersey PC Group

c/o Graduate Program for
Administrators
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2083 Lawrenceville Rd.
P.O. Box 6400
Lawrenceville, NJ 08648
(609) 896-5350
(609) 896-5351
(609) 896-5352
(609) 896-5357

Knowledge Man Users Group

c/o Tom Zappia
7616 Fourth Ave.
North Bergen, NJ 07047
(201) 662-1945

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Albuquerque PC Users Group

c/o Jennifer Norrid
PC Support
512 Chama N.E., Suite C
Albuquerque, NM 87108
(505) 265-5171

NEW YORK

QNPC

c/o Jerry Sitbon
Dept. of Computer Technology
Queensborough Community College
Bayside, NY 11364
(718) 631-6207

MicroPro Users Group of America

140 Riverside Dr.
New York, NY 10024
Pres: Jeffery Luria

East Coast Club

c/o Richard Parker
ComputerLand
79 Westbury Ave.
Carle Place, NY 11514

NYPC: The NY IBM Personal Computer Users Group

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Taking Notice of Bulletin Boards

Once starkly utilitarian, many bulletin boards now sparkle with color, graphics, and music. Along with this shift has come the emergence of a fledgling on-line graphics standard.

Bulletin board systems, or BBSs, are the computerized equivalent of the bulletin board in your local supermarket. Most are open for anyone to use, and except for the cost of the phone call, most are free.

Virtually all BBSs have a message area for exchanging messages, asking questions, or posting "for sale" notices. Most also have libraries of public-domain and freeware programs that you can have for the asking. On IBM-based BBSs, these libraries almost always include *PC-Talk III* and its various merge files. (For a review of *PC-Talk III* and merge files, see "The Urge to Merge," Volume 4 Number 5.)

As you probably know, *PC-Talk III* has become a standard in communications programs. There are any number of merge files available that modify *PC-Talk III* to give it additional features. Three of the more interesting files in the group add IBM 3101 terminal emulation and also open up the possibility for using color, music, and graphics with an on-line system. However, you can take advantage of these features only if the system you're talking to is set up to make use of them.

Until about a year ago, all BBSs were starkly utilitarian. This was not a matter of choice. Like most on-line systems, BBSs are designed to talk with the maximum number of computers and terminals. This means limiting output to text—the one thing that remains standard from system to system. BBSs are designed, in short, for the lowest common denominator: a teletypewriter.

In a vaguely symmetrical arrange-



ment, most communications programs—including the unmodified *PC-Talk III*—are designed to make your PC act like a teletypewriter. Even if a BBS were to send commands for color, music, or graphics, your system wouldn't respond correctly unless it were running a program that knows how to interpret the incoming information.

It works the other way, too. If your communications program is designed to interpret the incoming information, you can use color, music, and graphics.

RBBS is one of several programs that will let you run a bulletin board system on an IBM PC. It is one of the more popular programs for PC-based bulletin boards, largely because of its status as freeware. As with *PC-Talk III*, *RBBS* is free and is on many bulletin boards.

Moreover, *RBBS* gives the system op-

erator, or sysop, the capability to add color, music, and graphics to the bulletin board. Not all bulletin boards take advantage of this, but the user has the option of turning the features on or off on the ones that do.

Typically, when you sign on to a system that uses these features, it will ask you whether you want graphics. If you answer yes and if you have the right communications program, you get color, music, and graphics. If you don't have the right program, the commands for these functions show up as meaningless garbage on your screen.

The right program, in this case, is a suitably modified *PC-Talk III*. If you don't already have *PC-Talk III*, you can get it from a users' group. Another choice is to get it from a bulletin board with a communications program that includes the XMODEM error-checking protocol (such as *Crosstalk XVI*; *Hayes Smartcom II*, Version 2; *ASCUM*; and *Omniterm 2*.) If all else fails, you can send \$35 to Headlands Press, Inc., P.O. Box 862, Tiburon, CA 94920; phone (415) 435-9775 (Visa or Mastercard accepted with phone orders).

Once you have *PC-Talk*, there are several merge files available that will make the appropriate modification. The preferred file is the latest version of *BBS-TALK*. This program, written by Don Stickle, combines a number of features from *PC-Talk* files written by others. (See "The Urge to Merge," *PC*, Volume 4 Number 5.)

According to Stickle, *BBS-TALK6.MRG*, the most recent ver-

sion of BBS-TALK, gives bulletin boards several new capabilities. For instance, assuming you have a graphics card and color monitor, it lets bulletin boards both draw figures on your screen and fill them in with colors.

BBSTALK6.MRG will probably be available on most PC-based bulletin boards by the time you read this. According to Stickle, though, it is available on at least four systems as of this writing. The systems are: D.A.T.A. RBBS, (914) 634-8385 (sysop: Dennis Friedman); PC Manhattan, (212) 819-7942 (sysop: Greg Rismoen); The Capital PC Public Domain Software Library, (301) 949-8848 (password is IBMPC; sysop: Rich Schinnell); and an unnamed board at (615) 385-9919 (sysop: David Pardue).

Modifying PC-Talk III

To modify *PC-Talk III* with BBSTALK6.MRG, use the MERGE command in BASIC to join the two files. (See your BASIC manual or "The Urge to Merge," *PC*, Volume 4 Number 5.) Then, with the modified version of *PC-Talk III* in hand, you're ready to explore.

A good place to start is with the PC Manhattan RBBS. If you have a color monitor and tell the system you want graphics, you'll be treated to one of the more colorful menu displays I've ever seen. Even with a monochrome monitor, you'll see a highly readable layout.

D.A.T.A. RBBS also has colorful

menu displays. These are less spectacular than PC Manhattan's; however, the sign-on routine includes a short rendition of the theme song from *Star Wars*.

And if you like music, try the bulletins on Pardue's BBS. As of this writing, the bulletin labeled No. 5 isn't a bulletin—it's well over a minute's worth of computerized Bach.

Still another board worth looking at is Eclectic IBM BBS run by Dave Hunter at (914) 221-2248. Eclectic BBS specializes in color graphics for the PC and has an extensive library of on-line demonstration programs.

Unfortunately, you may find that much of this is interesting for its novelty. After a while, you're more likely to be bored than amused by a lengthy graphics and music sign-on message.

You'll also find that you have to pay a price for colorful menus on a bulletin board such as PC Manhattan. Turn the graphics off, and you'll immediately notice two things: The menus become less readable, and they appear on the screen much more quickly. The question is whether the loss in readability is worth the gain in speed.

Fine Tuning

Some systems bypass that question by improving readability in more subtle ways. A good example is the Invention Factory, run by Mike Sussel at (212) 431-1194. Rather than using a riot of col-

ors or a complex layout, the Invention Factory uses a slightly modified menu that takes advantage of the PC's character graphics. White lettering on a blue background helps on color monitors, but the layout is extremely readable even on a monochrome monitor. More importantly, there is no apparent loss in speed when you turn the graphics on.

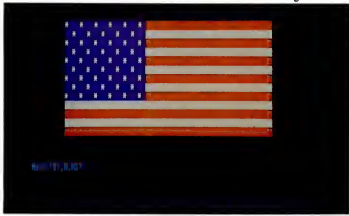
Another good example is the EXEC-PC BBS run by Bob Mahoney at (414) 964-5160. This is not an RBBS system but has similar capabilities. Mahoney is experimenting with a Lotus-like approach to menu choices. This lets you designate a selection either by moving the cursor to it with the space bar or by typing the first letter of the selection name. This trick, which makes use of the 3101 emulation in BBS-TALK, can be used with any program with 3101 emulation (*Crossstalk*, for one).

By the time you read this, there should be a new modification of *PC-Talk III*, called EXECPCPT, available on Mahoney's and other BBSs. EXECPCPT is similar to BBS-TALK, with some additional features added specifically for the EXEC-PC BBS. Be aware, also, that you need EXECPCPT Version 2 or later. There is a Version 1.1 floating around, but according to Mahoney, the graphics feature in Version 1.1 will not work with any known BBS.

It would be nice to wrap up this whirlwind tour with a prediction about the future of color, graphics, and music on BBSs. Unfortunately, the best I can offer is an observation or two.

Systems like the Invention Factory and EXEC PC show that even relatively subtle use of graphics and color on bulletin boards can translate to major improvements in usability. Keep in mind, also, that the accepted "standard" speed for communications keeps increasing. And the faster the speed, the less time lost even when drawing complex graphics on the screen.

Most importantly, the combination of RBBS and the modified *PC-Talk III* offers a fledgling on-line graphics standard for BBSs. It's already widespread enough to be notable, and it just may succeed in becoming the one that everyone chooses to match.



The Invention Factory is one of the new razzle-dazzle bulletin boards.

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COMING UP



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Reflections of UNIX

Six important UNIX products have been introduced to the PC operating-systems market: Three are licensed AT&T UNIX source-code derivatives, and three were written from scratch to mimic UNIX behavior. *PC Tech Journal* compares the features of these six products.

Character Device Drivers

PC Tech Journal will conduct a detailed examination of character device drivers. Included routines and modules will help you write your own devices.

Bubble Memory

Impervious to dust, dirty environments, fumes, and vibrations, bubble memory is well suited for systems that cannot use mechanical storage devices but must exist in a harsh environment or preserve data during a power loss. *PC Tech Journal* puts three bubble memory boards side-by-side for a complete technical comparison.

Diagnosing Disks

Rotational speed and radial and tangential head alignment are critical to the proper functioning of the PC's disk drives. *PC Tech Journal* reviews five new programs that are designed to test these factors.

System/34 for the PC, XT, and AT

The operating environment of the IBM System/34 minicomputer is now available to the PC with *Baby/34*. An upcoming review compares this program to the System/34 itself.

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Coming Up



Plugging into Your PC

When you think of expanding the functions of your PC, do you automatically think of installing add-on memory boards? Another way to expand your PC's options is to plug hardware into the front of your system unit. For instance, you could replace your PC's two floppy drives with two half-height floppies, a half-height plug-in hard disk, and a cartridge tape backup unit.

PC Magazine will test this hardware for speed and ease of installation. We'll discuss what you might need and how to choose from among the different types of disk drives. We'll also compare the advantages and disadvantages of the different hardware and software packages that vendors put together.

2001: An Accounting Package

2001, the accounting software from Financial Information Systems, was designed to give the small business owner/operator a powerful and sophisticated accounting system that is also easy to use. Does *2001* succeed in this ambitious goal? Price Waterhouse reviews the package and finds that the answer is not an easy yes or no.

Idea Processors: MaxThink, ThinkTank . . . and 1-2-3?

PC Magazine looks at several idea, or outline, processors. *MaxThink* belongs to the latest generation of outline processors. The package comes with a bunch of tricks, a programming language, and just a few bugs. *ThinkTank*, which preceded *MaxThink* into the marketplace, is not quite as easy to use as *MaxThink*, but both programs perform many of the same outlining functions. Need we say, though, that neither product can actually think for you?

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